

DIV. OF FISHES

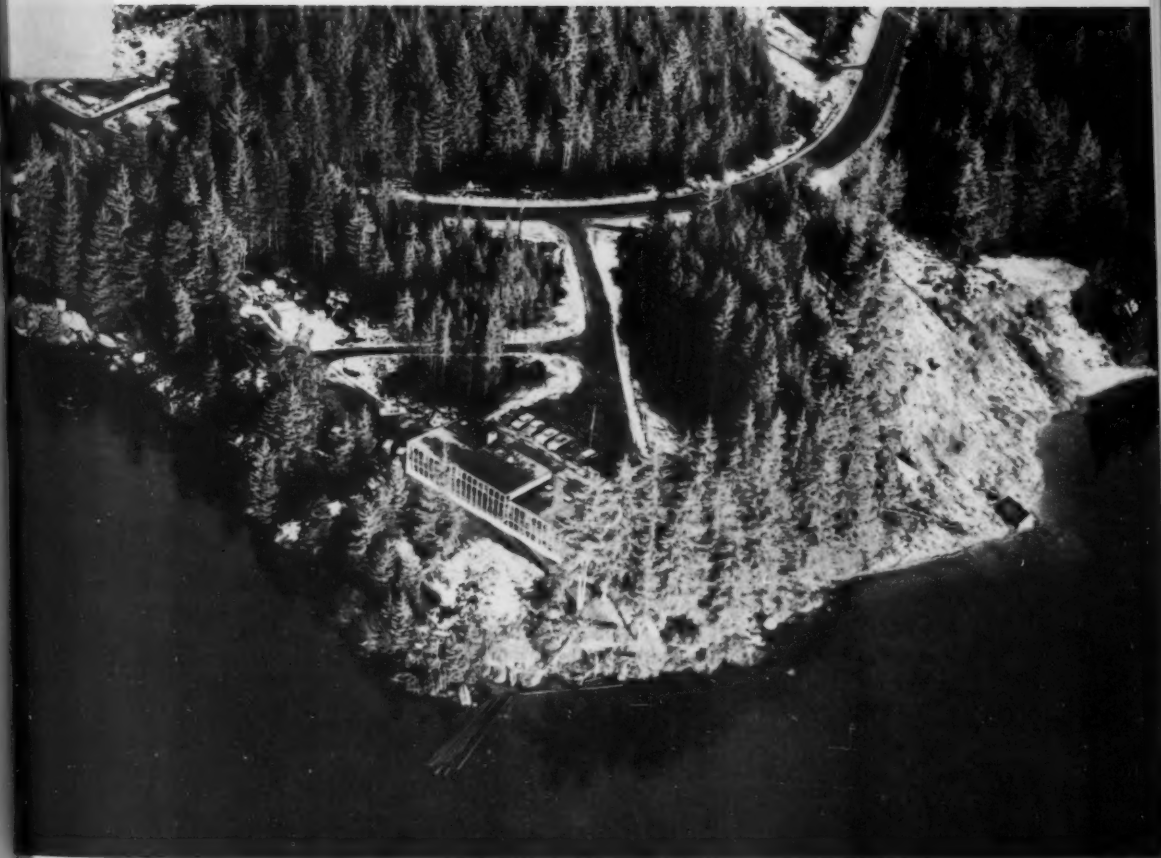
# COMMERCIAL FISHERIES REVIEW

THE UNIVERSITY  
OF MICHIGAN

JUL 6 1961

MUSEUMS

MUSEUM  
SH  
11  
A47



V. 23, NO. 6

JUNE 1961

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.







# COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries  
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor  
H. M. Bearse, Assistant Editor

Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

Publication of material from sources outside the Bureau is not an endorsement. The Bureau is not responsible for the accuracy of facts, views, or opinions contained in material from outside sources.

Although the contents of the publication have not been copyrighted and may be reprinted freely, reference to the source is appreciated.

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, May 10, 1960.

5/31/63

## CONTENTS

COVER: The Auke Bay Biological Laboratory, the newest  
research station of the U. S. Bureau of Commercial Fish-  
eries. (See p. 14 of this issue.)

- Page  
1 .. Bottom Trawling Explorations off the Washington and British Columbia Coasts, May-August 1960, by  
C. R. Hitz, H. C. Johnson, and A. T. Pruter  
12 .. Indexes of the Cost of Transportation for Fishery Products, by Don FitzGibbon

Page	TRENDS AND DEVELOPMENTS:
	Alaska:
14 ..	New Biological Laboratory at Auke Bay
15 ..	King Crab Tagged by Japanese off Kodiak Taken in Alitak Bay
	Antarctica:
15 ..	Navy Cargo Ship to be Refitted for Research Atomic Waste:
16 ..	University Receives Grant For Study of Ocean Disposal Problems
	California:
17 ..	Shrimp Study off California Coast Continued
	Central Pacific Fishery Investigations:
17 ..	Collection of Biological Data on Tuna at American Samoa
18 ..	Threadfin Shad Continues to Show Promise as Live Bait for Skipjack Tuna
	Clams:
19 ..	New England Hard Clams Transplanted in France Thrive
	Films:
19 ..	Interior Receives International Motion Picture Award for Fishery Film
20 ..	Sponge Film of U. S. Bureau of Commercial Fisheries Wins Recognition
	Fish Flour:
20 ..	Interior Secretary Luncheon Points Way to End Protein Deficiency
	Fisheries Loan Fund:
21 ..	Loans Approved, January 1-March 31, 1961
	Fishing Vessel Construction Differential Subsidy:
22 ..	First Application Received
	Fishing Vessel Mortgage and Loan Insurance:
22 ..	Cases Approved, January-March 1961
	Great Lakes Fishery Investigations:
23 ..	Lake Erie Fish Population Survey for 1961 Season Begins

Page	TRENDS AND DEVELOPMENTS (Contd.):
	Great Lakes Fishery Investigations (Contd.):
24 ..	Research Vessel Siscowet Program for 1961
	Gulf Fishery Investigations:
24 ..	Shrimp Fishery Investigations
26 ..	Industrial Fishery Studies
26 ..	Effect of Pesticides on Marine Organisms
	Hawaii:
27 ..	Commercial Fisheries Landings, 1960
	Maine Sardines:
27 ..	Canning Industry Ready for 1961 Season
28 ..	Canned Stocks, April 1, 1961
29 ..	Feeding Tests Indicate Value as a Cholesterol Depressant
	Michigan:
29 ..	Smelt Dip-Net Fishing Season Prospects Poor
	National Fisheries Institute:
30 ..	16th Annual Convention
	North Atlantic Fishery Investigations:
34 ..	Vertical Movements of Whiting Studied
34 ..	Fluke Tagged off Middle Atlantic Coast
	North Pacific Exploratory Fishery Program:
34 ..	Pelagic Trawl-Gear Development
35 ..	Bottom Fish Trawling Exploration off Oregon Coast
	Oceanography:
35 ..	California Institution Receives Grant for Marine Research Vessel
37 ..	Commerce Department Announces First Ocean-Wide Survey
	Oregon:
38 ..	Over 11 Million Salmon Released in State's Waters
	Oysters:
38 ..	Cell Structure of Pacific Oysters to be Studied

Contents continued pages II and III.

## CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENTS (Contd.):		FOREIGN (Contd.):
	Salmon:		Ecuador (Contd.):
39 ..	King Salmon Eggs Sent by Washington State to Japan Hatch Successfully	58 ..	Fishing Industry, 1961
39 ..	Test Fishing in Columbia River Aids Management of Resource	58 ..	Shrimp Industry
	South Carolina:		France:
39 ..	Fisheries Biological Research Progress, September 1960-March 1961	59 ..	Fish Meal and Oil Prices, First Quarter 1961
	Standards:		German Federal Republic:
42 ..	Voluntary Quality Standards Proposed for Frozen Fried Scallops	59 ..	Trawler Trade Seeks Large Scale Government Support
	United States:	60 ..	Fish Meal Prices, April 7, 1961
42 ..	Fishery Trends for 1960 Show Tuna and Shrimp Popularity Increased		Ghana:
43 ..	United States Fishing Fleet Additions, March 1961	61 ..	Expansion of Fisheries Aided by Government Planning
43 ..	U. S. Fish Meal and Solubles Production and Imports, January-February 1961		Iceland:
	U. S. Foreign Trade:	62 ..	Fishery Products Export to Soviet Bloc, 1960
44 ..	Edible Fishery Products, February 1961	63 ..	Westman Islands Fishing Tie-Up Ended
44 ..	Imports of Canned Tuna in Brine Under Quota		India:
45 ..	U. S. Production of Fish Sticks and Portions, January-March 1961	63 ..	National Committee Set Up for Oceanic Research
	Virginia:		Italy:
46 ..	Fisheries Landings in 1960 Top 30-Year Average	63 ..	Canners Seek Inspection and Claims System for Japanese Frozen Tuna Imports
46 ..	Oceanographic Research Vessel Requested by Fisheries Laboratory	64 ..	Imports of Japanese Frozen Tuna on Duty-Free Basis Set at 14,000 Tons
47 ..	Wholesale Prices, April 1961		Japan:
	FOREIGN:	64 ..	Canned Tuna Exports, 1955-59
	International:	64 ..	Canned Tuna Exports to United States
	Fishing Limits:	65 ..	Frozen and Canned Tuna Exports, 1947-1959; 1935-1939 Average
49 ..	British-Icelandic Dispute Settled	65 ..	Floor Prices Fixed for Exports of Canned Tuna in Oil to Canada
	Food and Agriculture Organization:	65 ..	Exporters Associations Establish 1961/62 Frozen Tuna Export Quotas to U. S.
49 ..	Fishery Officer to Head Ecuadoran Fishery Institute	66 ..	France May Import Frozen Tuna
50 ..	Regional Fisheries Body for West Africa Under Consideration	66 ..	Frozen Tuna Export Agreement with Czechoslovakia Signed
	Fourth Convention on Economic Relations with the African Continent:	66 ..	Producers Apply for Permission to Ship Frozen Atlantic Ocean Tuna to Japan
50 ..	Meeting Held in Naples, Italy, Stresses Fisheries	66 ..	Bluefin Tuna Fishing in Indian Ocean
	Sealing:	67 ..	Claims Against Frozen Tuna Decreasing in United States
51 ..	Hunting by Canadians, Norwegians, and Russians in Northeast Atlantic	67 ..	Delegation Studies Sites for Overseas Tuna Bases
	Angola:	67 ..	Equatorial Atlantic Ocean Tuna Fishing Trends
52 ..	Fishing Industry Depressed	67 ..	Large Fishery Firm to Build Two Large Tuna Vessels
	Belgium:	68 ..	Number of Portable Vessels on Tuna Motherships Under Study
52 ..	Duty Imposed on Fish Meal Imports	68 ..	Bering Sea Bottom Fishery Plans for 1961
53 ..	Fish-Meal Prices, April 1961	68 ..	Bristol Bay Fish Meal Factorship Fishery Trends
	Canada:	69 ..	Crab Fishing in Bristol Bay
53 ..	New Canned Lobster Regulations Require Certain Data on Can	69 ..	Canned Sardine Packers Announce Prices and Targets for 1961
53 ..	Lake Erie Gill Net Mesh Size Restrictions Removed	69 ..	Sardine Fishing in One Area Reported Good
54 ..	Law Defining "Fishing Vessel" Revised	70 ..	Sardine Fishing Good in Several Areas
	Market for British Columbia Fish Meal Improves as Fishing Season Ends	70 ..	Second Sale of Canned Salmon to Great Britain
55 ..	Market Prospects for Canned Salmon	70 ..	Canned Mackerel Packers Announce Prices and Targets for 1961
55 ..	Plans to Continue Subsidy on Dogfish Livers in 1961/62	70 ..	Fishery Agency Proposal to Stabilize Fish Meal Market
55 ..	Use of Citric Acid Permitted in Canned Spring Mackerel	71 ..	Import of Additional 10,000 Tons of Peruvian Fish Meal
	Ceylon:	71 ..	Feed Supply Committee Recommends Import of 32,000 Tons of Fish Meal
55 ..	Fisheries Training Center to be Established with Aid of Japanese	71 ..	Fish Sausage and Freezing Plants Completed
	Denmark:	71 ..	Large Company Sets Processed Fishery Products Production Target
56 ..	Exports of Fish Solubles, 1957-60	72 ..	Large Fishery Firm Plans to Invest over \$5 Million in 1961
56 ..	Shrimp Processing Methods	72 ..	Marine-Oil Supply, Foreign Trade, and Consumption, 1959-1961
	Ecuador:		
57 ..	Adheres to Inter-American Tropical Tuna Convention		

Contents continued page III.

## CONTENT (CONTINUED)

Page	FOREIGN (Contd.):	Page	FOREIGN (Contd.):
	Japan (Contd.):		U. S. S. R.:
74 ..	Trade Agency Plans Second Trade Show in New York City	82 ..	Factoryship Stern-Trawlers for Fishing in Tropics
	Mexico:	83 ..	Fishing for Ocean Perch off Newfoundland and in Sea of Japan Planned
74 ..	Ensenada Fishery Trends, First Quarter 1961	83 ..	Fishing in Bering Sea
74 ..	Merida Fishery Trends, First Quarter 1961	83 ..	Flashing Lights to Lure Herring
75 ..	Shrimp Fishery Trends, April 1961	83 ..	Statement on Fisheries Plans and Research
75 ..	Export Duties Revised for Some Fishery Products		United Kingdom:
75 ..	Experimental Fishing with Gill Nets for Spanish Mackerel	86 ..	Electronic Fish-Thawing Unit Developed
	New Guinea:	86 ..	Vertical Plate Freezer for New Stern Trawler
75 ..	Expert Claims Good Potential for Shrimp Fishery		FEDERAL ACTIONS:
	Nicaragua:		Department of Health, Education, and Welfare:
76 ..	New Fisheries Law Established		Food and Drug Administration:
	Norway:	88 ..	Additive Approved for Canned Shellfish
77 ..	Antarctic Whaling Production Up in 1960/61 Season		Department of the Interior:
77 ..	Fishing Firm Plans to Build Research Laboratory		Fish and Wildlife Service:
77 ..	Fishing Limits Extended		Bureau of Commercial Fisheries:
77 ..	Winter-Spring Herring Fishery Worst in Many Years	88 ..	Fishing Vessel Mortgage Insurance Clarifying Amendment
77 ..	Fishery Landings, 1957-1960	88 ..	Revised Budget Includes Funds for Salmon and Oceanography Research
	Peru:	89 ..	Top Fishery Posts Filled
79 ..	Exports of Marine Products, Fourth Quarter 1960 and Years 1959-60		Department of the Treasury:
79 ..	French Expert Studies Site for New Fishing Port		Coast Guard:
	Philippines:	90 ..	Fisheries Law Enforcement Aided
80 ..	Trading Company Opens Bids for Canned Sardines		White House:
	Ryukyu Islands:	90 ..	Conventions on Law of the Sea Signed by President
80 ..	Japanese Fishing Company Establishes Joint Fishery Company in Okinawa	90 ..	President Asks Increase in Fiscal Year 1962 Budget for Oceanographic Research
	South-West Africa:	92 ..	Eighty-Seventh Congress (First Session)
80 ..	Spiny Lobster Landings Best in Seven Years		FISHERY INDICATORS:
	Sweden:	98 ..	Chart 1 - Fishery Landings for Selected States
81 ..	Date of International Fisheries Fair Changed	99 ..	Chart 2 - Landings for Selected Fisheries
	Togo:	100 ..	Chart 3 - Cold-Storage Holdings and Freezings of Fishery Products
81 ..	Fishing Industry	101 ..	Chart 4 - Receipts and Cold-Storage Holdings of Fishery Products at Principal Distribution Centers
	Tonga Islands:	101 ..	Chart 5 - Fish Meal and Oil Production--U. S. and Alaska
81 ..	Attempt to Establish a Tuna Fishery Resumed	102 ..	Chart 6 - Canned Packs of Selected Fishery Products
	Union of South Africa:	103 ..	Chart 7 - U. S. Fishery Products Imports
82 ..	1961 Pilchard Season off to Good Start		RECENT FISHERY PUBLICATIONS:
		104 ..	Fish and Wildlife Service Publications
		106 ..	Miscellaneous Publications



Editorial Assistant--Ruth V. Keefe

Compositors--Jean Zalevsky, Alma Greene, Janice Broquet, and Helen Parette

\*\*\*\*\*

Photograph Credits: Page by page, the following list gives the source or photographer for each photograph in this issue. Photographs on pages not mentioned were obtained from the Service's file and the photographers are unknown.

P. 19--E. Macklow; p. 20--W. K. Kubichek; p. 29--F. H. Meisnest; pp. 30-32--Chase Ltd., Wash., D. C.; p. 34--H. C. Johnson; p. 47--J. Pileggi; p. 61--J. O. Traung, FAO; p. 77--W. H. Stolting.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.  
Price 60 cents (single copy). Subscription Price: \$5.50 a year; \$2 additional for foreign mailing.

# COMMERCIAL FISHERIES REVIEW

June 1961

Washington 25, D.C.

Vol. 23, No. 6

## BOTTOM TRAWLING EXPLORATIONS OFF THE WASHINGTON AND BRITISH COLUMBIA COASTS, MAY-AUGUST 1960

By C. R. Hitz,\* H. C. Johnson,\* and A. T. Pruter\*\*

### ABSTRACT

Exploration of several areas of the continental shelf off Washington and British Columbia, where the bottom had previously been considered too rough for commercial fishing, was carried out by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb in 1960. The explorations, made possible by the development in recent years of high-resolution echo-sounding equipment and navigational aids that permit precision pin-pointing of bottom areas, were conducted by (a) running an initial series of closely-spaced echo-sounder transects over the rough bottom areas, (b) dragging a heavy chain attached between two trawl doors over areas showing promise on the echo-sounder recordings, and (c) evaluating the fish populations of those areas where the chain was dragged successfully by exploratory fishing with commercial otter-trawl gear. The explorations resulted in the delineation of several trawlable areas off Cape Flattery and one relatively large area northwest of Scott Island—all within depths presently fished by the commercial fleet. In most of these areas exploratory trawling resulted in good catches of commercially-valuable groundfish.

### INTRODUCTION

In the past, groundfish explorations by the U. S. Bureau of Commercial Fisheries in the northeastern Pacific Ocean have been conducted in waters off Alaska where no North American commercial trawl fisheries for groundfish yet exist (Ellison, Knake, and Dassow, 1949; Ellison, Powell, and Hildebrand, 1950; Schaefer, Smith, and Greenwood, 1955; and Johnson, 1959) and in deep water adjacent to exploited grounds off Oregon, Washington, and British Columbia (Alverson 1951 and 1953).

There remain, however, large segments of the continental shelf within the present operating depth range of Pacific Northwest trawlers that are not fished because the bottom is considered too rough. Many of these "foul bottom" areas are adjacent to grounds fished by trawlers operating out of Washington and Oregon ports. Systematic surveys of these "unfishable" regions are now possible, owing to the development in recent years of high-resolution echo sounders and precise navigational aids. Echo sounders are available that not only show the depth of water under a vessel, but also provide information on the degree of hardness and give detailed data on configuration of the bottom. Navigational aids such as loran and radar can be used to pinpoint the location of trawlable areas.

In 1960 the Bureau, using a new survey technique, conducted explorations off Cape Flattery, Wash., in a region known locally as the "spit" and off the north end of Vancouver Island, British Columbia—both regions in which bedrock, coral, and large boulders had prevented fishing by commercial trawlers. Objectives of the explorations were (1) to locate areas suitable for trawling and (2) to evaluate the commercial potential of groundfish inhabiting those areas.

\*Fishery Methods and Equipment Specialist  
\*\*Fishery Research Biologist

} Exploratory Fishing and Gear Research Base, Branch of Exploratory Fishing, Division of Industrial Research, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

## METHODS AND GEAR

The exploratory fishing vessel John N. Cobb (Ellson 1950) was used for the surveys. The procedure followed in exploring a given area was (1) to run a series of sounding transects to determine the character of the bottom, (2) to drag a heavy chain over areas suggested as being trawlable by the sounding, and (3) to drag a commercial otter-trawl net over those grounds on which the chain was successfully dragged. The latter permitted evaluating the commercial potential of the groundfish present.

At the conclusion of each net drag a bathythermograph cast was made to determine surface-to-bottom water temperatures, and a Dietz-LaFond sampler was used to obtain samples of bottom deposits.

The position of the vessel was determined frequently during sounding transects, chain drags, and trawl-net drags. If the area was located so that two loran signals could be received, the vessel position was established by the use of loran only. When only one loran channel could be received, radar bearings were used to complete fixes. When land was outside radar range, radar buoys (Johnson 1959) were anchored at known positions and were used as reference points.

Sounding transects were generally made on grids approximately  $\frac{3}{4}$  of a mile to  $1\frac{1}{2}$  miles apart. When a transect course was run, the echo sounder provided a recording of the bottom

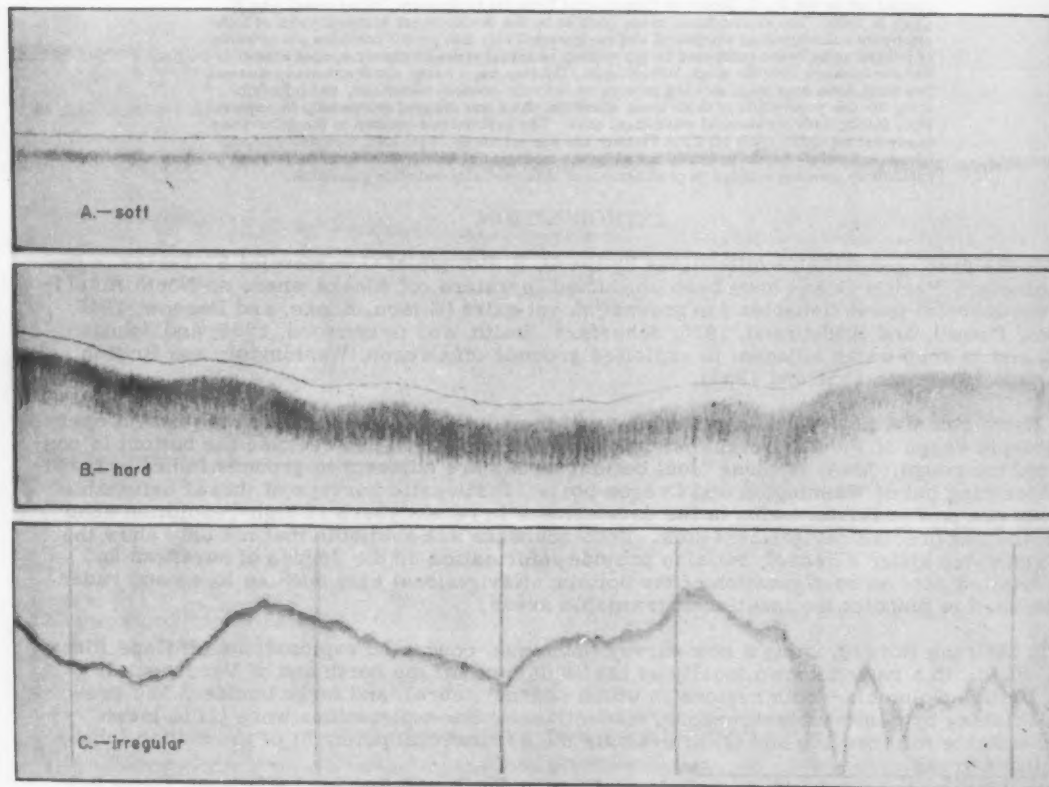


Fig. 1 - Sample tracings of echo-sounder paper showing soft and hard bottom of fairly uniform depth (A and B) and irregular bottom (C).



on paper. At the start and end of each transect, as well as at frequent intervals between, marks were made on the paper, which could be related to plotted positions on the chart. This provided a permanent record of the bottom in the regions surveyed. After a series of sounding tracks was completed, the echo papers were studied to evaluate the general substrate and bottom configuration (fig. 1).

Indicated snags and bottom types (soft, intermediate, and hard) were noted on the navigation chart. Thus, after a series of sounding transects was completed, the characteristics of the bottom of the region surveyed could be evaluated from inspection of the chart. A wet- or dry-paper white-line echo sounder (38 kc., 220 volt; 50 cycle/sec. AC) having a maximum depth range of 1,750 fathoms was used for sounding.

From the composite pictures obtained from the sounding transects, drags were made on promising-looking grounds (generally those showing soft bottom) with a  $\frac{3}{4}$ -inch chain, 42 feet long (fig. 2). The chain was attached between the otter doors in place of the net and was dragged to locate possible snags and other obstructions on the bottom that were not shown by the echo sounder. This procedure of dragging the chain before a drag was made with the net prevented damage to, or loss of, nets that otherwise would have occurred. Chain drags were also made in areas where hard bottom was indicated, since trawling is often feasible over such grounds if the topographic changes are not abrupt and large boulders are not present.

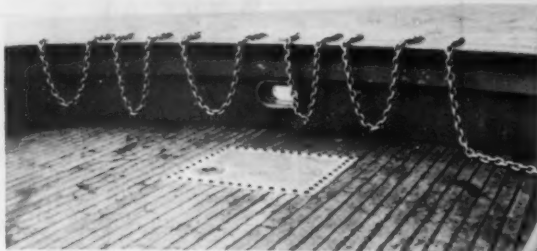


Fig. 2 - Chain ( $\frac{3}{4}$ -inch diameter, 42 feet long) used in explorations to locate obstructions on bottom.

After the chain was successfully dragged through an area, a 400-mesh eastern otter-trawl net (Greenwood 1958) rigged according to commercial practice, was used to sample the populations of fish present. Drags with the net were usually of 1-hour duration, although some were as long as 2 hours.

The total weight of each species of fish and shellfish caught was estimated for each drag and representative length-frequency samples of the commercially-valuable species of fish were taken in each of the major areas explored.

#### AREAS EXPLORED

The region explored is shown in figure 3. The area west of Cape Flattery was surveyed during the period May 2 to June 24, 1960, and those adjacent to the Scott Islands and east of Cape St. James, the southernmost point of the Queen Charlotte Islands, were explored from July 18, to September 9, 1960.

The Cape Flattery "spit" area lies between La Perouse Bank and the 100-fathom isobath. The continental shelf in this region slopes off gradually from around 50 to 85 fathoms and then drops off abruptly.

Off the northwest tip of Vancouver Island the Scott Islands form a westerly chain delimiting the southern boundary of Queen Charlotte Sound. The continental shelf to the south of the islands is narrow, and the slope beyond 100 fathoms is steep. In contrast, the continental shelf is relatively flat in the area explored northwest of the islands, extending nearly 20 miles to seaward before reaching a depth of 100 fathoms.

#### RESULTS

During the exploratory cruises a total of 126 sounding tracks, 118 snag-chain drags, and 56 drags with the trawl net were made. Several trawlable grounds were delineated off Cape





Fig. 3 - Region explored.

Flattery, and one relatively large trawlable area was found northwest of the Scott Islands. Exploratory fishing in most of these areas resulted in good catches of commercially valuable groundfishes.

**CAPE FLATTERY "SPIT" AREA:** A total of 75 chain drags and 38 trawl-net drags was made in the "spit" area west of Cape Flattery. During these drags the chain hung up 55 times; however, the net was snagged in only three instances. Sounding transects showing the general interpreted substrate features of this area are shown in figure 4, and the position of each net drag and the snags encountered are shown in figure 5.

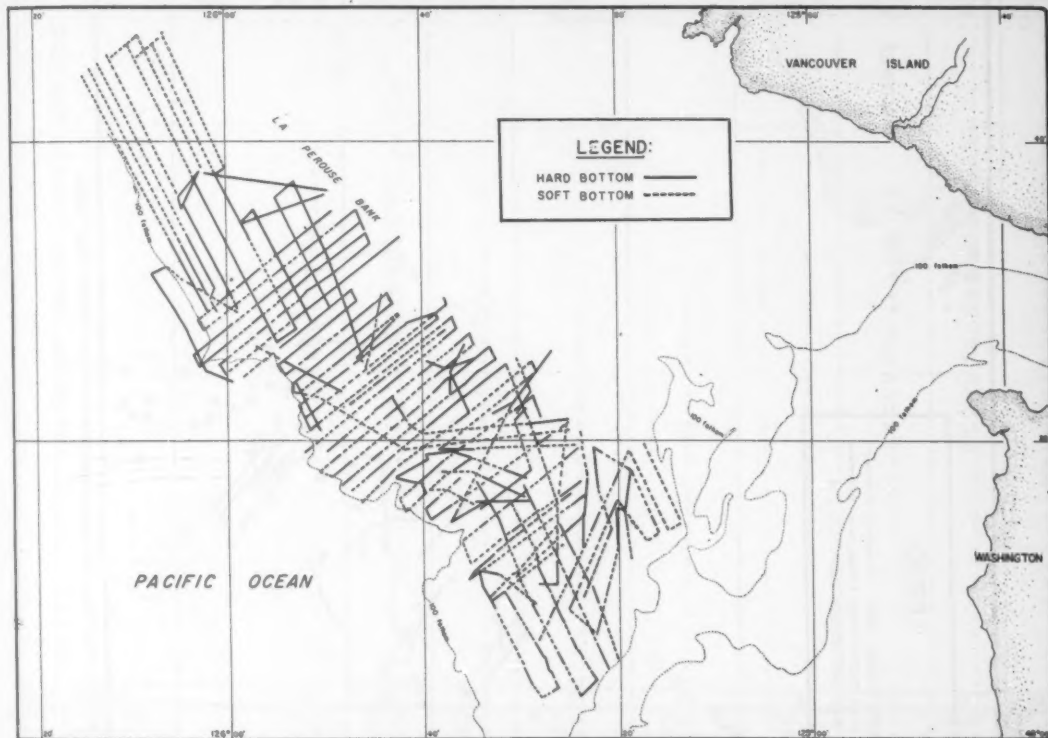


Fig. 4 - Sounding transects in Cape Flattery "spit" area.

In the "spit" area, five grounds in which commercial trawling could be conducted were delineated. These grounds may be oriented on figure 5 from the following drag numbers:

Ground	Drag No.
1	1 - 22
2	3 - 11
3	12 - 15
4	16 - 23
5	24 - 37

Dogfish shark (*Squalus acanthias*) dominated the catches from the two drags made on ground 1 at depths from 58 to 97 fathoms.

Approximately 15 square miles of trawlable bottom at depths ranging from 66 to 84 fathoms were located on ground 2. Catches of Petrale sole (*Eopsetta jordani*) averaging

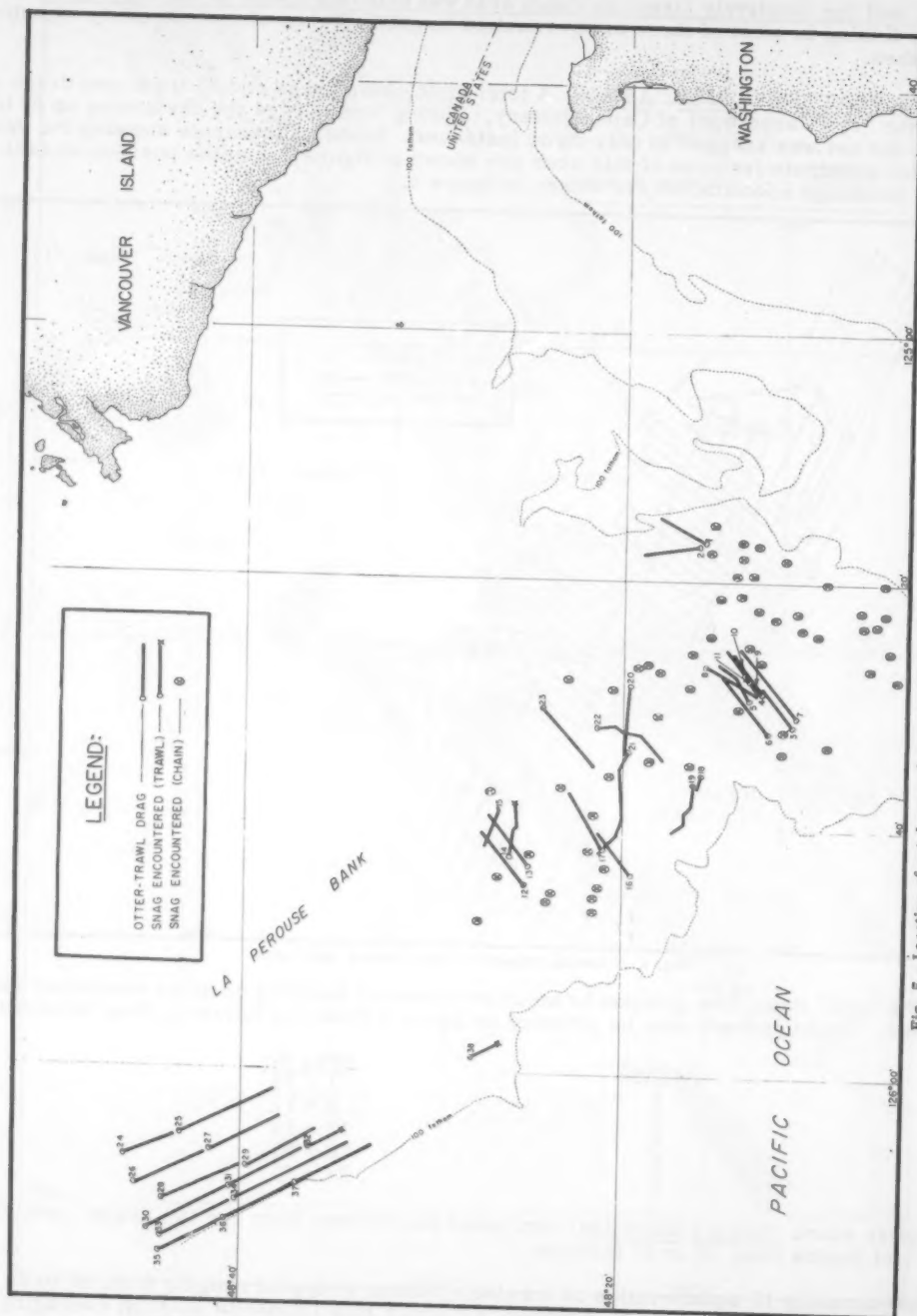


Fig. 5 - Location of net drags and snags encountered in Cape Flattery "spit" area.

1,150 pounds per hour were made in drags 4 and 5. Most of the Petrale sole caught on this ground were of commercial size. Length frequency samples of this species taken in drags 10 and 11 are shown in table 1. Fair catches of black rockfish, primarily the silvergray rockfish (*Sebastes brevispinus*), were made in most of the drags on this ground.

Table 1 - Representative Length Frequencies of Several Important Species of Fish Caught off Cape Flattery, Wash., and Near Cape Scott, British Columbia

Table 1 - Representative Length Frequencies of Several Important Species of Fish Caught off Cape Flattery, Wash., and Near Cape Scott, British Columbia										
Total Length Cm.	Rockfish						Flounders			
	Pacific Ocean Perch			Silver Gray	Canary	Convict	Petrals Sole	Dover Sole	Rock Sole	
	Drag	#26, 35	#40, 42	#50, 52	#48	#48, 50, 52	#48, 50, 52	#10, 11	#40	#46
	(Number of Fish)									
23										1
24										-
25										-
26			2							-
27			1							2
28			1						2	1
29			5						2	4
30			6						4	7
31		4	5						3	3
32		4	15	2				2	5	5
33		3	27	-				-	3	9
34		4	27	-				-	7	5
35		6	38	-		1		3	13	17
36		6	21	4		-	1	4	9	7
37		10	22	-		-	-	5	12	7
38		10	20	4		-	-	5	12	4
39		20	35	-	1	2	-	8	12	3
40		23	23	14	-	2	1	4	9	9
41		26	30	10	4	2	-	13	13	7
42		21	21	6	1	5	-	22	15	6
43		19	15	8	5	4	1	29	15	5
44		12	9	10	3	4	1	24	10	5
45		11	13	4	3	5	4	14	14	5
46		3	2	8	6	10	1	13	13	2
47		5	1	2	3	5	4	10	11	-
48		-	2	2	2	2	8	8	9	3
49		-	-	-	4	2	8	1	6	3
50		-	-	-	1	1	8	3	1	-
51		-	-	-	1	1	4	1	4	-
52		-	-	-	2	1	1	-	3	-
53		-	-	-	3	3	1	-	-	-
54		-	-	-	1	1	1	-	-	-
55		-	-	-	2	2	-	1	-	-
56		-	-	-	1	-	-	-	-	-
57		-	-	-	-	-	-	-	-	-
58		-	-	-	-	-	-	-	-	-
59		-	-	-	-	-	-	-	-	-
60		-	-	-	-	-	-	-	-	-
61		-	-	-	1	-	-	-	-	-
Total of Sample		187	341	74	44	53	44	170	207	120
Avg. Length cm.		40.5	37.5	41.9	47.1	45.5	48.1	43.0	40.9	37.2
Avg. Length in.		15.9	14.8	16.5	18.5	17.9	18.9	16.9	16.1	14.6

A trawlable area of about 10 square miles was found on ground 3 at depths ranging from 57 to 72 fathoms. Drags 12 to 14 made in this area produced an average of 2,200 pounds of Dover sole (*Microstomus pacificus*) per hour of fishing. Almost all of the Dover sole were of commercial size.

A trawlable area of about 28 square miles was found on ground 4. Test drags yielded mainly canary rockfish (*Sebastes pinniger*) and silvergray rockfish. Rockfish catches ranged up to 4,500 pounds per hour of fishing. Drag 23 on this ground produced 1,000 pounds of Dover sole per hour of fishing.

On the northwest corner of the area surveyed off Cape Flattery (ground 5), approximately 60 square miles of trawlable ground were found at depths ranging from 61 to 92 fathoms. Exploratory fishing in this portion of the area produced catches of Pacific ocean perch (*Sebastes alutus*) up to 3,750 pounds per hour, with an average catch for 12 drags (26 to 37) of about 1,250 pounds per hour. Measurements of this species caught in drags 26 and 35 (table 1) show an average length of 40.5 cm. (15.9 inches), with a range from 31 cm. (12.2 inches)

to 47 cm. (18.5 inches). In the two shallowest drags (24 and 25) turbot (*Atheresthes stomias*) dominated the catches.

**CAPE SCOTT AND QUEEN CHARLOTTE SOUND AREA:** A total of 43 chain drags and 18 net drags was made in the Cape Scott-Queen Charlotte Sound area. The sounding transects are shown in figure 6, and the location of each net drag and the snags encountered are shown in figure 7.

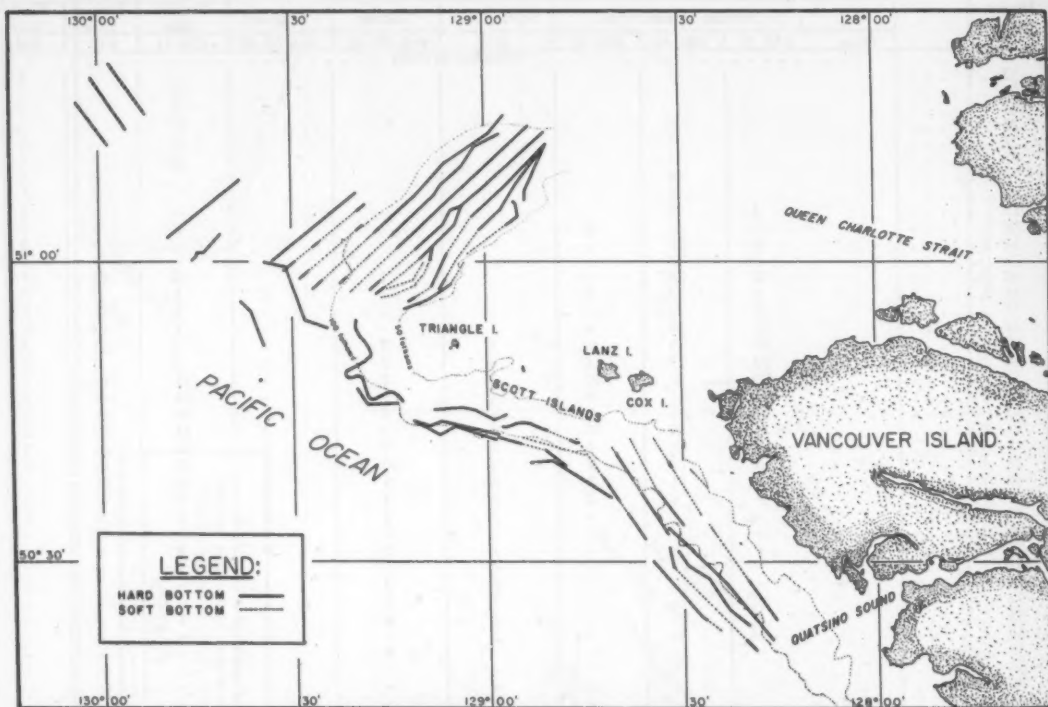


Fig. 6 - Sounding transects in Cape Scott area.

Grounds south of the Scott Islands generally were very uneven and hard. The snag chain hung up 28 times in a total of 33 drags made with this gear, and only 7 drags with the net could be made. A small trawlable area approximately 1 mile wide and 6 miles long was located south of Triangle Island at depths between 104 and 116 fathoms. Drag numbers 40, 41, and 42 made on that ground resulted in good catches of Pacific ocean perch. Drag number 40 also provided 1,200 pounds of Dover sole. The Dover sole from this drag were of good size, averaging 41 cm. (16.1 inches) in length (table 1). Samples of Pacific ocean perch (table 1) from drags 40 and 42 ranged from 26 cm. (10.2 inches) to 48 cm. (18.9 inches) in length, with an average length of 37.5 cm. (14.8 inches).

Northwest of Triangle Island a large trawlable area of approximately 60 square miles was found. Soundings made during the survey suggest that the continental shelf in this area extends seaward a considerable distance farther than indicated on the sailing or navigational charts. Eleven drags were made in this area at depths ranging from 50 to 119 fathoms. The shallowest drags (numbers 46 and 47) made in 50 to 53 fathoms produced mainly rock sole (*Lepidopsetta bilineata*), which averaged about 750 pounds per hour of fishing. The rock sole taken in drag 46 averaged 37.2 cm. (14.6 inches) and ranged from 23 cm. (9.1 inches) to 49 cm. (19.3 inches) in length (table 1). A few petrale sole also were mixed in these catches. In deeper drags at depths between 73 and 119 fathoms, rockfish dominated the catches.

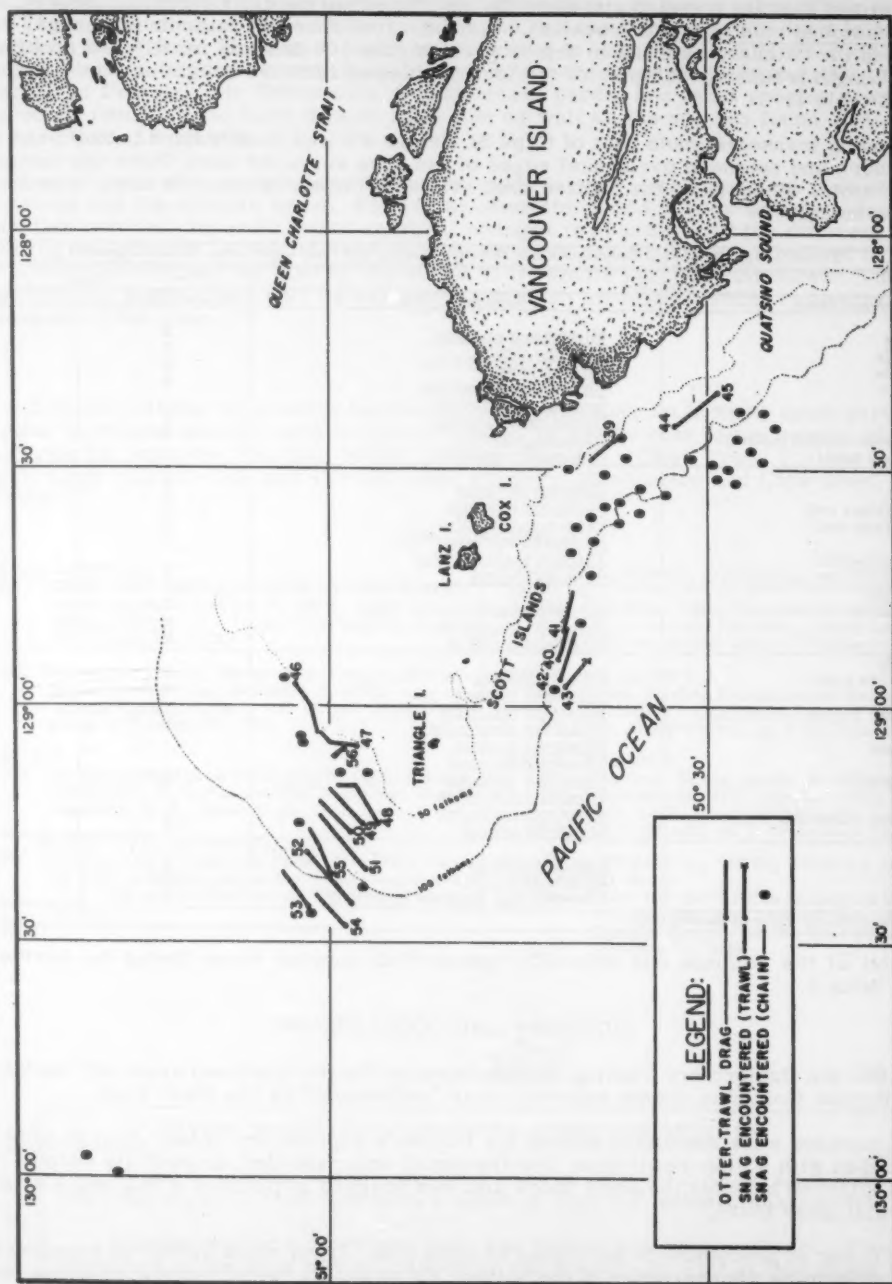


Fig. 7 - Location of net drags and snags encountered in Cape Scott area.



The dominant species encountered were the Pacific ocean perch, silvergray, canary, and convict (*Sebastes rubrivinctus*) rockfish. In depths less than 100 fathoms silvergray rockfish dominated the catches, whereas in depths greater than 100 fathoms mostly red rockfish were taken. Length frequency samples of the four species of rockfish caught on these grounds are shown in table 1.

Sounding transects made east of Cape St. James showed mostly hard bottom, and only at the northern and southern peripheral edges of the area surveyed were there any indications of soft bottom. Because of the limited time available for surveying this area, only one chain drag was made.

Table 2 - Species of Fish Caught off Cape Flattery, Wash., and Near Cape Scott, British Columbia

Common Name	Species	Scientific Name	Area	
			Cape Flattery	Cape Scott
<b>Flatfish:</b>				
Dover sole		<u>Microstomus pacificus</u>	X	X
English sole		<u>Parophrys vetulus</u>	X	X
Petrale sole		<u>Eopsetta jordan</u>	X	X
Rex sole		<u>Glyptocephalus zachirus</u>	X	X
Rock sole		<u>Lepidopsetta bilineata</u>		X
Halibut		<u>Hippoglossus stenolepis</u>	X	X
Turbot (Arrow-toothed halibut) <sup>1/</sup>		<u>Atheresthes stomias</u>	X	X
Mottled sand dabl <sup>1/</sup>		<u>Citharichthys sordidus</u>		X
<b>Roundfish:</b>				
Lingcod		<u>Ophiodon elongatus</u>	X	X
Sablefish (black cod)		<u>Anoplopoma fimbria</u>	X	X
True cod (gray cod)		<u>Gadus macrocephalus</u>	X	X
Hake <sup>1/</sup>		<u>Merluccius productus</u>	X	X
Whiting (pollack) <sup>1/</sup>		<u>Theragra chalcogramma</u>		X
Shad <sup>1/</sup>		<u>Alosa sapidissima</u>	X	
<b>Black rockfish:</b>				
Yellow-tailed		<u>Sebastes flavidus</u>	X	X
Silvergray		<u>Sebastes brevispinus</u>	X	X
Black		<u>Sebastes melanops</u>	X	
<b>Red rockfish:</b>				
Pacific ocean perch		<u>Sebastes alutus</u>	X	X
Canary		<u>Sebastes pinniger</u>	X	X
Red snapper		<u>Sebastes ruberrimus</u>		X
Convict		<u>Sebastes rubrivinctus</u>	X	X
Olivebacked		<u>Sebastes saxicola</u>		X
Stripetail		<u>Sebastes zacentrus</u>		X
Greenstriped <sup>1/</sup>		<u>Sebastes elongatus</u>	X	X
Widow <sup>1/</sup>		<u>Sebastes entomelas</u>		X
Rock salmon (Bocaccio) <sup>1/</sup>		<u>Sebastes paucispinis</u>		X
Redstriped		<u>Sebastes proriger</u>	X	X
<b>Other fish:</b>				
Dogfish <sup>1/</sup>		<u>Squalus acanthias</u>	X	X
Ratfish <sup>1/</sup>		<u>Hydrolagus collieri</u>	X	X
Skates <sup>1/</sup>		Primarily <u>Raja china</u> and <u>binoculata</u>	X	X

<sup>1/</sup>Limited commercial value at present time.

<sup>1/</sup>Limited commercial value at present time.

A list of the common and scientific names of all species taken during the surveys is given in table 2.

#### SUMMARY AND CONCLUSIONS

In 1960 the Exploratory Fishing Section based at Seattle explored areas off the Washington and British Columbia coasts referred to as "unfishable" by the trawl fleet.

The surveys were conducted aboard the Bureau's exploratory vessel John N. Cobb, which was equipped with a high-resolution, low-frequency echo-sounder; a specially adapted chain that was attached between the otter doors and was dragged in place of a net; and a standard commercial otter trawl.

The order of procedure in surveying an area was: (1) to run a series of sounding transects to determine the character of the bottom, (2) to drag a heavy chain over areas suggested by the soundings as being trawlable, and (3) to drag a commercial otter trawl net over those grounds on which the chain was successfully towed.



Trawlable grounds and concentrations of commercially valuable groundfish were found in the "spit" area west of Cape Flattery and in the regions bordering the Scott Islands. The area explored off Cape St. James, however, appeared to have little if any trawling bottom. Off Cape Flattery the discovered trawlable grounds were found to be inhabited by commercial quantities of Petrale sole, Dover sole, Pacific ocean perch, and other species of rockfish. On the grounds found off the Scott Islands rock sole as well as the species found off Cape Flattery were taken in quantity.

Time of year when exploratory drags are made largely determines the size of the catches obtained and the species found. Fishing at other times of the year would produce larger or smaller catches, depending upon seasonal changes in abundance of the different species inhabiting the grounds. Thus, the value of the explorations should be judged not only by the size of catches obtained but also by the extent of trawlable grounds delineated. The potential yield from the grounds can only be determined through extensive fishing by the trawl fleet at all seasons of the year.

#### APPENDIX

A detailed fishing log showing the fishing positions, time on bottom, catch particulars, and other pertinent data for each drag is available as an appendix to the reprint of this article. Write for Separate No. 620, which contains "Table 3 - Otter Trawl Fishing Log - M/V John N. Cobb - Cruises 46 and 47 - Off Cape Flattery, Washington and Cape Scott, British Columbia."

#### LITERATURE CITED

ALVERSON, DAYTON L.

1951. A Deep-Water Trawling Survey off the Coast of Washington (August 27-October 19, 1951). *Commercial Fisheries Review*, vol. 13, no. 11 (November), pp. 1-16 (Separate No. 292).

1953. Deep-Water Trawling Survey off the Oregon and Washington Coasts (August 25-October 3, 1952). *Commercial Fisheries Review*, vol. 15, no. 10 (October), pp. 5-15 (Separate No. 359).

ELLSON, J. G.

1950. The Exploratory Fishing Vessel John N. Cobb, Fishery Leaflet 385, U. S. Fish and Wildlife Service, Washington 25, D. C., October, pp. 1-11.

KNAKE, BORIS, and DASSOW, JOHN

1949. Report of Alaska Exploratory Fishing Expedition, Fall of 1948, to Northern Bering Sea, Fishery Leaflet 342, U. S. Fish and Wildlife Service, Washington, June, 25 pp.

ELLSON, J. G.; POWELL, DONALD E.; and HILDERBRAND, HENRY H.

1950. Exploratory Fishing Expedition to the Northern Bering Sea in June and July 1949. Fishery Leaflet 369, U. S. Fish and Wildlife Service, Washington, March, 56 pp.

GREENWOOD, MELVIN R.

1958. Bottom Trawling Explorations off Southeastern Alaska, 1956-1957. *Commercial Fisheries Review*, vol. 20, no. 12 (December), pp. 9-21 (Separate No. 532).

JOHNSON, HAROLD C.

1959. King Crab, Shrimp, and Bottom Fish Explorations from Shumagin Islands to Unalaska, Alaska - Summer and Fall, 1957. *Commercial Fisheries Review*, vol. 21, no. 3 (March), pp. 7-19 (Separate No. 543).

SCHAEFERS, EDWARD A.; SMITH, KEITH A.; and GREENWOOD, M. R.

1955. Bottom Fish and Shellfish Explorations in the Prince William Sound Area, Alaska, 1954. *Commercial Fisheries Review*, vol. 17, no. 4 (April), pp. 6-28 (Separate No. 398).



#### SOVIET SCIENTISTS DISCOVER UNKNOWN SPECIES

Soviet scientists in 1960 were reported to have brought up a hitherto unknown species of fish from a depth of over 4.5 miles in the Pacific.

The fish having a colorless body was free of scales completely. The structure of its eyes was influenced by the absence of light at that depth, some 24,786 feet below the surface. The fish were jellylike and no bigger than a pin head. (Japanese newspaper, November 18, 1960.)

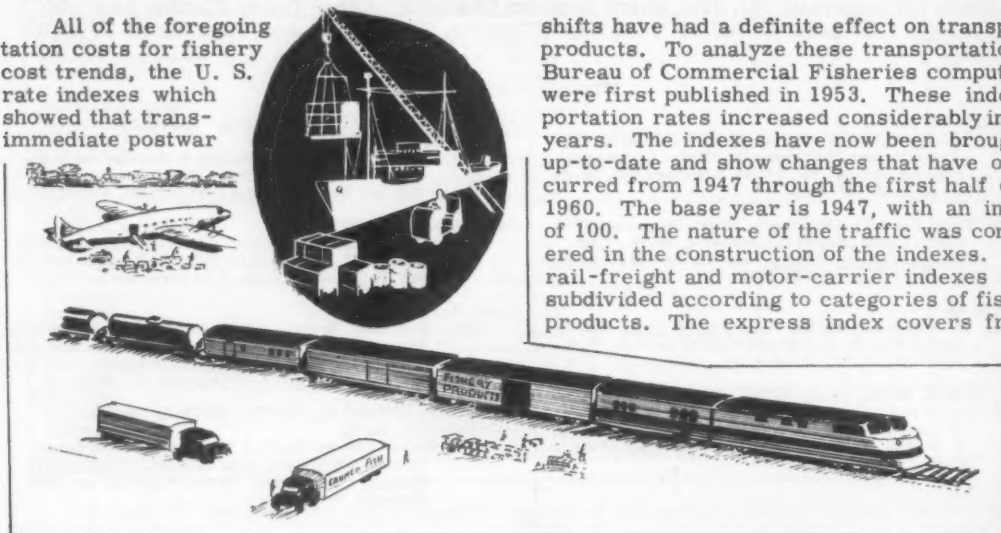
## INDEXES OF THE COST OF TRANSPORTATION FOR FISHERY PRODUCTS

By Don FitzGibbon\*

The cost of transporting fishery products from the port of landing to the consumer is of concern to many segments of the fishing industry. Transportation costs are a sizable item in the over-all cost of marketing fishery products, and as with most such products can mean the difference between a profit or a loss for many firms.

Of the three types of carriers transporting fishery products, the railroads carry the largest quantity. The tonnage carried by rail is made up principally of frozen fish, canned fishery products, and byproducts (such as fish meal, oil, and solubles). All of these are products that usually are shipped long distances. Motor carriers have been accounting for an increased tonnage each year. This is particularly true on the West Coast, where motor carriers appear to be transporting larger amounts of canned fish. The amount of fishery products carried by REA Express, although extremely vital to many shippers, has been on the decline. Shippers are looking for a substitute method of transportation for small shipments, and have found some local service available on bus lines.

All of the foregoing transportation costs for fishery cost trends, the U. S. rate indexes which showed that trans-immediate postwar



shifts have had a definite effect on transportation products. To analyze these transportation Bureau of Commercial Fisheries computed were first published in 1953. These indexes portation rates increased considerably in the years. The indexes have now been brought up-to-date and show changes that have occurred from 1947 through the first half of 1960. The base year is 1947, with an index of 100. The nature of the traffic was considered in the construction of the indexes. The rail-freight and motor-carrier indexes are subdivided according to categories of fishery products. The express index covers fresh

and frozen traffic only, and a regional breakdown is used for that index.

There has been a general upward trend since 1947 in the weighted average index of all three types of carriers combined--in 1959 the index rose to 184.8 percent of 1947. The individual indexes by types of carriers are rail freight 171.9, express 198.0, and motor carriers 206.3. Both the motor-carrier index and the express index have increased more than the rail-freight index. (See table 1.)

The average rail-freight rate index for all fishery products has shown a steady increase since 1947, reaching an all-time high of 171.9 in 1959. The combined rail-freight rate index of all individual fishery products analyzed, except fish meal, shows a similar trend since 1947. The rate index for canned, fresh, and frozen fishery products reached a

\*Commodity Industry Analyst, Branch of Economics, Division of Industrial Research, U. S. Bureau of Commercial Fisheries, Washington, D. C.

Table 1 - Transportation Rate Indexes for Three Types of Carriers of Fishery Products, 1947-1960

Year	Average all Traffic <sup>1/</sup>	Rail Freight	Rail Express	Motor Carriers
1960 <sup>1/</sup>	188.2	171.9	208.7	214.0
1959	184.8	171.9	198.0	206.3
1958	182.8	171.7	192.7	201.8
1957	179.0	174.2	191.3	184.6
1956	168.8	163.6	178.0	176.2
1955	160.7	155.1	169.6	168.8
1954	158.7	153.8	169.2	164.9
1953	153.2	152.6	154.4	153.9
1952	148.3	150.4	146.4	144.6
1951	136.1	139.6	133.5	130.0
1950	131.2	136.7	129.8	120.8
1949	127.5	133.9	120.8	116.8
1948	117.4	122.5	110.3	109.6
1947	100.0	100.0	100.0	100.0

<sup>1/</sup>Weighted average; relative weights: rail freight 60 percent, rail express 10 percent, motor carriers 30 percent.

<sup>2/</sup>Only data for first six months included.

Table 2 - Summary of Rail Freight Rate Indexes, 1947-1960

Year	All Fishery Products	Canned Fish	Fish Meal	Fish Oil (not edible or medicinal)	Fish, Fresh or Frozen
1960 <sup>1/</sup>	171.9	197.3	139.8	194.7	197.3
1959	171.9	197.3	139.8	194.7	197.3
1958	171.7	196.8 <sup>2/</sup>	139.7	194.4	196.8
1957	174.2	151.7	179.2	181.9	183.8
1956	163.6	144.0	168.8	170.0	171.6
1955	155.1	139.4	156.7	162.2	161.9
1954	153.8	142.5	149.1	162.2	161.2
1953	152.6	144.0	149.4	162.2	154.8
1952	150.4	142.1	150.5	158.6	150.5
1951	139.6	134.8	141.1	146.2	136.3
1950	136.7	133.8	136.4	141.1	131.4
1949	133.9	134.8	133.1	135.9	131.7
1948	122.5	124.7	121.8	121.3	122.0
1947	100.0	100.0	100.0	100.0	100.0

<sup>1/</sup>Only data for first six months included.

<sup>2/</sup>Carload weight changed.

high of 197.3 in 1959. Fish-oil rates reached a slightly lower level by 1959 with an index of 194.7. The fish-meal rate index declined in 1958, dropping from 179.2 in 1957 to 139.7 in 1958. The principal reason for the latter drop appears to be an increase in minimum carload weights with accompanying lower rates that became effective in 1958. The heavier loadings allowed for reduced rates per hundred pounds but still gave the carriers about the same return in per-car earnings. (See table 2.)

The express-rate index has shown a steady upward trend. Its all-time high for all the regions combined was 198.0 in 1959. The regional indexes ranged, in 1959, from 261.0 in the New England area to 171.3 in the South Atlantic and Gulf areas. The average index in 1959 for the Pacific coast was 195.6; the Great Lakes, 181.9; and the Middle Atlantic area, 180.2. All of the foregoing regional indexes show a steady upward trend from 1947. (See table 3.)

The same selective routes as given in the previous U. S. Bureau of Commercial Fisheries publication<sup>1/</sup> were used. These routes may be considered as the most important shipping routes between the leading production and consumption areas of the United States. However, the various routes were not weighted to reflect their importance. For this reason, these indexes should be treated only as indicators of trends.

Origins and destinations of shipments have been changing rapidly in recent years, as have the modes of transportation. Air transportation is playing a vital role in the movement of some fishery products, and piggyback carriage is on the increase. It may be expected that the next publication of rate indexes will reflect these changes and perhaps others not yet anticipated.

Table 3 - Summary of Rail Express Rate Indexes, 1947-1960

Year	All Regions Combined	New England	Middle Atlantic	South Atlantic and Gulf	Great Lakes	Pacific Coast
1960 <sup>1/</sup>	208.7	275.2	188.7	178.8	194.4	206.6
1959	198.0	261.0	180.2	171.3	181.9	195.6
1958	192.7	253.9	175.9	170.9	175.6	190.1
1957	191.3	245.0	175.9	170.9	174.8	190.1
1956	178.0	226.5	164.1	159.8	162.0	177.7
1955	169.6	216.4	157.6	153.6	155.6	164.6
1954	169.2	216.4	157.6	153.8	155.7	162.6
1953	154.4	195.0	143.7	142.4	140.7	150.3
1952	146.4	178.6	137.2	139.3	132.9	144.1
1951	133.5	152.7	127.0	138.4	118.2	131.1
1950	129.8	141.4	125.9	134.7	116.9	129.9
1949	120.8	127.3	116.0	123.9	115.6	121.1
1948	110.3	117.1	109.8	110.0	107.6	107.0
1947	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1/</sup>Only data for first six months included.

## APPENDIX

Detailed tabulations, showing the monthly change in the rate indexes for fish and shellfish products, are available as an appendix to the reprint of this article. They show the changes in the indexes for REA Express, motor carriers, and railroad freight which have occurred from 1947 through the first half of 1960. (Tables 4-7.)

<sup>1/</sup>Circular 23 - Indexes of Transportation Rates for Fishery Products, 1953, U. S. Bureau of Commercial Fisheries.



# TRENDS AND DEVELOPMENTS

## Alaska

### NEW BIOLOGICAL LABORATORY AT AUKE BAY:

The Auke Bay Biological Laboratory, near Juneau, Alaska, is the newest research station of the U. S. Bureau of Commercial Fisheries. Although not fully equipped, it is already fulfilling an important role in providing basic information of Alaska's fishes--

only long-established facilities at Little Port Walter and Karluk and Brooks Lakes but also more recent stations at Kasitsna Bay, Olsen Bay, Traitors Cove, and Rampart. Basic research is conducted on herring, king crab, and the five species of Pacific salmon and on the food and predatory species associated with them. Physical environmental studies of lakes, streams, and the ocean itself are also part of the program.



The site of the Auke Bay Biological Laboratory near Juneau, Alaska. In the foreground is the salt-water bay and in the center of the photo is Auke Lake, a fresh water body of water.

information that is vitally needed to solve the problems of resource management created by Alaska's large harvest of fishes, which are distributed to the nation and the world.

Studies organized at the laboratory involve farflung stations where necessary field data are obtained. They include not

The Auke Bay facility will be equipped to test field situations under controlled conditions. For this purpose salt water will be taken from the bay and fresh water from Auke Lake, which is located just across the highway from the laboratory and provides a convenient natural environment for observing salmon runs.

\* \* \* \* \*



# KING CRAB TAGGED BY JAPANESE OFF KODIAK TAKEN IN ALITAK BAY:

A tagged king crab caught by crab pot in Alitak Bay, Kodiak Island by United States fishermen in early March 1961 was evidence that Japanese fishing operations had finally extended to the vicinity of Kodiak. On a red plastic disc attached to the leg of the crab was a number and the legend, "Hokuyo."



The tagged crab was taken to Port Wakefield and flown to the Alaska Department of Fish and Game Headquarters at Kodiak for further examination by a king crab specialist.

The specialist promptly wrote the Tokai Regional Fisheries Research Laboratories at Tokyo inquiring as to when and where the crab was tagged and released. A quick reply from a Japanese fisheries company revealed that limited king crab tagging had been done in the Shumagin and Kodiak Island areas during September 1960, when 235 king crabs were released by three vessels of the Shinyo Maru fishing fleet belonging to the company while engaged in an exploratory research program.

The crab caught at Alitak was one of these. It had been released off Kodiak and had migrated 27 miles to Alitak Bay after six months of freedom.

The Alaskan specialist surmised that the released tagged crabs were taken incidentally during Japanese exploratory bottom fish ventures during the past summer and that they were released in the same area of capture.

The crabs, as indicated by the one captured, were all tagged in an unusual manner. The tag was threaded through a leg near the body on the underside, instead of having their mark in a more typical location on top of the shell or through the isthmus for permanent retention. Powell believes this location was

chosen by the Japanese so as not to conflict with the crab-tagging programs of the United States.

During the period between August 31 and September 10, 35 male and 1 female king crab were tagged by the Shinyo vessels and released at four locations in the Shumagin Island area. All of these releases were within 12 miles of shore.

Between September 18 and 20, the Japanese released 76 male and 123 female king crab at nine locations off Alitak Bay. The locations extended from 9 to 47 miles outside the three-mile limit. Japanese records received by the specialist gave the tag number, latitude, longitude, depth, date, sex, width of shell, and weight relative to each of the crabs released.

Due to the excellent cooperation of the Japanese in supplying tag data, the specialist believes the offshore king crab studies proposed by the Alaska Department of Fish and Game in 1961 will benefit by these Japanese tagging operations.

The Japanese fishing company has requested the Alaska Department of Fish and Game that if any of their marked crabs are found in the future, that knowledge of their number, location, and date of capture be forwarded to them at Tokyo to facilitate the company's survey and research program.



## Antarctica

### NAVY CARGO SHIP TO BE REFITTED FOR RESEARCH:

The United States Navy ship Eltanin, an ice-strengthened cargo ship, will become a marine scientific laboratory of the U. S. Antarctic Research Program under the terms of an agreement announced on April 16, 1961, by the Director of the National Science Foundation (NSF) and the Commander, Military Sea Transportation Service (MSTS).

Research projects aboard the Eltanin will encompass any scientific work that may be carried out on shipboard. The Foundation is now accepting proposals for research in the oceans adjacent to the Antarctic, and it is expected that the first research cruise will begin in the late fall of 1961.

The ship will be fitted to accommodate numerous disciplines, including meteorology, upper atmosphere studies, marine and terrestrial biology, physical oceanography, submarine geology, and geomagnetic studies.

The agreement between the Foundation, which administers the Antarctic Research Program, and MSTs, which owns and operates the *Eltanin*, provides for conversion of the cargo vessel into a polar research ship during the summer and fall. Cost of conversion will be principally borne by the Foundation, but the MSTs will award the conversion contract and supervise the ship's modification.

Versatility and flexibility of equipment and laboratory deck spaces compatible with the demands of seaworthiness and safety are incorporated in the plans for alteration. It is planned to convert the present cargo hold and between decks to laboratories, quarters for scientific parties, and scientific stores. In addition, enclosed laboratories will be built on the forward part of the main deck extending from the forecastle head to the main mast. Maindeck space forward of the bridge superstructure and aft of the main mast will in general be clear for trawling and allied overside operations.

A helicopter deck is to be installed aft of the bridge.

Under the terms of the agreement, the *Eltanin* will continue to be owned and operated by MSTs. The Foundation, as sponsor of the ship, is responsible for the scientific program and will designate a senior scientist aboard. It is expected that the ship will work in Antarctic waters at least ten months a year. Individual cruises will vary from a month to two or more months in length, depending on the research in progress. During refueling calls at Southern Hemisphere ports, scientists will be able to change equipment for experiments and resupply their projects.

The *Eltanin* is a small ice-strengthened cargo ship designed and built for polar supply missions. She is 266 feet long, has a 51-foot beam, and will draw about 19 feet. Double-hull feature is extended up to the main deck and other cold-weather operation characteristics are built in. Classed as T-AK 270, she is of welded steel construction with a raked icebreaker-type form bow and a modified cruiser stern. Engine space and

crew quarters are aft. Propulsion power is Diesel-electric, driving twin screws; shaft horsepower is 2,700, speed approximately 13 knots, and range at 12 knots about 10,000 miles.



## Atomic Waste

### UNIVERSITY RECEIVES GRANT FOR STUDY OF OCEAN DISPOSAL PROBLEMS:

The U. S. Atomic Energy Commission (AEC) has awarded Columbia University's Lamont Geological Observatory a contract to study ocean waters to determine the effect of atomic waste disposal in the oceans.

The research, scheduled to begin this summer in the North Atlantic near Bermuda, will include studying ocean movements by dropping a common red dye into the ocean at selected sites.

Water will be sampled at various ocean depths by a ship towing a sensitive device that can record as little as two parts of dye to 100 billion parts of water. The device will also contain other instruments for measuring the temperature and depth of the ocean water sampled.

Until the actual mixing, spreading, and circulation rates of specific ocean areas are known, no reasonable control over atomic waste disposal in the ocean can be expected, the director of the Observatory and the project said.

Although the research will cover a small portion of the Atlantic Ocean, the AEC hopes the program can eventually be extended to cover major ocean areas.

The research by the Observatory will be financed by a \$290,000 grant from the AEC. Another contract, involving \$200,000, was awarded by AEC to a Washington, D. C., firm for developing and testing the equipment to be used in the study.

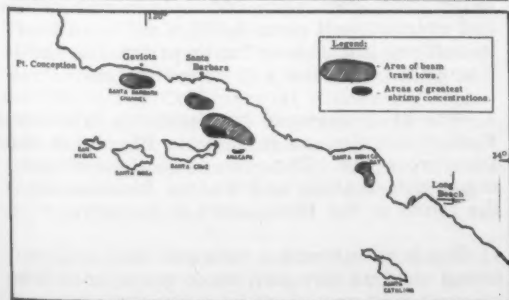


## California

## SHRIMP STUDY OFF CALIFORNIA COAST CONTINUED:

M/V "Alaska" Cruise 61-A-1-Shrimp:

The coastal waters off central and southern California from San Simeon to Santa Monica were surveyed (Jan. 16-Feb. 14, 1961) by the

M/V Alaska Cruise 61-A-1-Shrimp.

California Department of Fish and Game research vessel Alaska. Objectives were (1) to conduct exploratory fishing operations for pink shrimp, *Pandalus jordani*, to locate areas of concentration; (2) to determine size, sex and weight of shrimp from the areas examined; (3) to obtain bottom temperatures in shrimp-fishing areas; and (4) to determine species, numbers, and weights of fish and invertebrates caught with the shrimp.

A total of 122 tows was made with the 20-foot beam trawl, each averaging 20 minutes fishing time.

Summary of Exploratory Fishing for *Pandalus jordani*.

Area	Number of Tows	Depth (fathoms)	Results
Santa Monica Bay	10	88 to 150	Only a few shrimp in this area.
Santa Barbara Channel	54	107 to 170	Shrimp were in fair quantities off Santa Cruz Island; a trace or none in other areas.
Pt. San Luis, Morro Bay, Pt. Buchon, San Simeon	58	107 to 150	Greatest concentrations were off Pt. San Luis and Pt. Sal. Traces found off Morro Bay, Pt. Buchon. None off San Simeon.

Shrimp were captured in 54 of the 122 tows. Samples were taken of the shrimp and biological data are being processed to determine the potential for each of several species. Amounts per tow ranged from about 900 pounds of shrimp in one 20-minute haul to as few as one or two individuals.

A total of 120 bathythermograph casts was made. Bottom temperatures ranged from 8.4° to 10.3° C. (47.12° - 50.54° F.).

The fish caught along with pink shrimp were primarily small hake, *Merluccius productus*, and splitnose rockfish, *Sebastes diploproa*. Invertebrates were chiefly jellyfish, sea urchins, and sea pens.

Note: Also see Commercial Fisheries Review, Feb. 1961 p. 16.



## Central Pacific Fishery Investigations

## COLLECTION OF BIOLOGICAL DATA ON TUNA AT AMERICAN SAMOA:

A biologist from the Hawaiian Biological Laboratory of the U. S. Bureau of Commercial Fisheries during the six-week period ending March 6 surveyed the American Sa-



moa tuna industry preliminary to establishing a station for collecting biological data.

The only tuna cannery is located on the island of Tutuila, American Samoa. Processing and canning of long-line-caught tunas was started in 1954 by the present management; however, the basic cannery facilities were erected some years prior to 1954. The tunas are supplied by a fleet of mostly Japanese and one or two Korean long-line vessels. As these fish are available to the long-line fishing gear throughout the year, the cannery operates the year-around. The catch is predominantly albacore and during the trip made by the biologist, albacore made up 86 percent of the total catch of 1,926 fish.

Fresh blood samples were collected on board the Yuki Maru, a combination salmon gill-netting and tuna long-lining vessel. During the trip, fishing operations were carried out on 22 days in waters north and northwest of the Samoan Island group. The blood collection brought back to the Hawaii Laboratory included 85 albacore, 30 yellowfin, and 24 samples from other miscellaneous species taken on long-line gear.

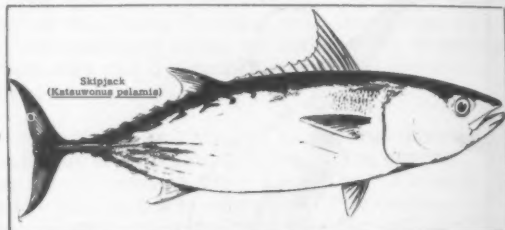
Other data collected on the trip included the daily catch, vessel position, length and sex of various species of fish, and details of the operational aspects of fishing. With regard to the latter, it is interesting to note the long hours of work that the long-line fishing method requires. The Yuki Maru fished 280 baskets of gear (1,400 hooks) with setting operations commencing at 5 a.m. and ending about 8:30 a.m. Hauling operations started at about 12:30 p.m. and generally did not end till about 2 a.m. the following morning.

The organization of a biological sampling program at the cannery was found to be feasible for albacore tuna. Under the present operating conditions, the size and sex of albacore can be obtained at the butchering line since these fish are landed in the round. On the other hand, with yellowfin and big-eyed tuna, the sex determinations at the cannery lines are dependent upon gonad remnants in the body cavity, since those fish are gutted at sea. General locality of capture information may be obtained by interviewing vessel personnel.

\* \* \* \* \*

#### THREADFIN SHAD CONTINUES TO SHOW PROMISE AS LIVE BAIT FOR SKIPJACK TUNA:

The threadfin shad (*Dorosoma petenense*) was introduced in Hawaii by the U.S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu and the Hawaii State Division of Fish and Game as a possible supplementary live bait for skipjack tuna and as feed for some of the fresh-water game fishes. This variety of shad has been used extensively in United States lakes and rivers as a forage fish. Its prolific spawning habits and relatively small size (maximum length about 7 inches) make it ideal for this purpose. It naturally feeds on water weeds, microscopic plants, and animals, and has been kept successfully as commercial trout feed in captivity.



The first large-scale introduction to Hawaii was made in August 1959, when an estimated 4,000 shad arrived aboard a freighter in a specially made fish tank. These shad had been gradually shifted from fresh to sea water before the voyage from California, and were shifted back to fresh water after their arrival in the islands. The change from fresh to sea water and back was made very gradually over a period of 3 days to avoid killing the fish.

Plantings ranging from 200, and up to 1,200 fish were made in 3 reservoirs and 2 rivers during August-September 1959. Besides those that were released in reservoirs and rivers, well over 1,000 shad were kept in outdoor and indoor tanks at the Bureau's Honolulu Laboratory for observation.

The shad spawned successfully in Wahiawa Reservoir, Nuuanu Reservoir #4, and in Maui Reservoir #44. There were no signs of spawning in the Anahulu and Wailua Rivers, nor in the tanks at the Bureau's Laboratory.

Sea tests aboard a skipjack tuna sampan using shad as live bait were made in 1958 by

the Hawaiian Tuna Packers and Bureau biologists. The results were very encouraging as they showed that skipjack tuna readily accepted this type shad as food, and the rate at which skipjack tuna were caught with threadfin shad was better than with other live bait (nehu) during the test. However, this was not conclusive since only a few buckets of threadfin shad were available for the tests. Further studies will have to be made before it can be determined whether threadfin shad will be a good supplementary live bait for skipjack tuna.



## Clams

### NEW ENGLAND HARD CLAMS TRANSPLANTED IN FRANCE THRIVE:

French fishery scientists have been so successful in growing New England hard clams that they have requested another shipment, according to the U. S. Bureau of Commercial Fisheries. Two years ago the Director of the Bureau's Biological Laboratory at Milford, Conn., while in Europe consulting with other shellfish scientists, described the success achieved by his laboratory in the artificial cultivation of oysters and clams and suggested that French scientists experiment with New England grown juvenile molluscs. The French scientists eagerly accepted his offer. New England hard-shell clams or quahogs (*Venus mercenaria*) were chosen for the test. A total of 70,000 young clams were carefully shipped by air to Paris where they were met by French fishery scientists and sped to experimental beds at Arcachon and La Tremblade for planting.

These pioneer clams have done so well in French waters that recently the French Institut Scientifique et Technique des Pêches Maritimes, an institution corresponding to our Bureau of Commercial Fisheries, has asked for an additional shipment. This time, the clams will be assigned to the Mediterranean where they are expected to thrive in the much warmer waters than are found along the west coast of France.

Clams sent several years ago by the Milford Laboratory to Florida have made remarkable progress so there are high hopes for the latest shipment which will make

their new home in the warm waters off the south of France.

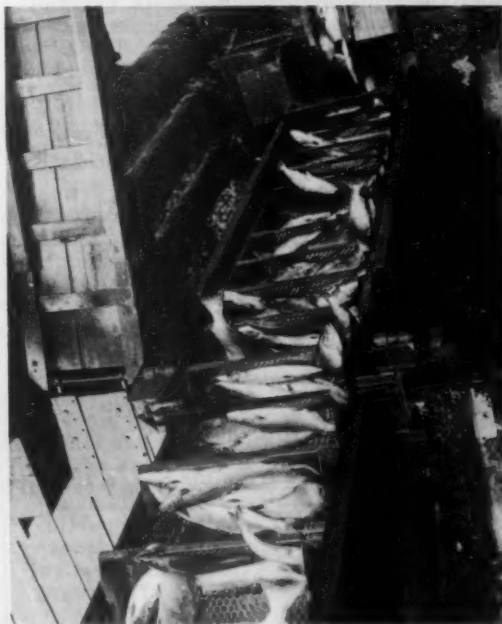


## Films

### INTERIOR RECEIVES INTERNATIONAL MOTION PICTURE AWARD FOR FISHERY FILM:

Presentation of awards for two Department of the Interior sound-color films shown at the Edinburgh, Scotland, International Film Festival were made at the British Embassy in Washington, D. C., on March 28, 1961.

The films are *Salmon--Catch to Can*, produced by the Bureau of Commercial Fisheries, and financed by the salmon industry, and *The Whooping Crane*, produced by the Bureau of Sport Fisheries and Wildlife.



Using a conveyor belt to unload fresh salmon at a cannery. Salmon being transported to be washed and cleaned prior to canning.

*Salmon--Catch to Can* is a documentary portraying the biology of salmon, methods of catching, and a glimpse at its utilization. It was one of the seven U. S. Government films so honored at the Film Festival in 1960.

The Whooping Crane is a documentary of America's all-but-extinct whooping crane. It was shown at the Edinburgh Festival in 1959. Presentation of the award was unavoidably delayed.



Family of whooping cranes at Long Lake, Aransas Refuge, Tex.

The awards are diplomas of participation in acknowledgement of the fact that the pictures were selected and shown at the Edinburgh Festival. To qualify for such a showing the films had to undergo a severe screening test in this country in competition with other Government-produced films and then equally severe screenings in London and Edinburgh before final selection. The Edinburgh International Film Festival is held each September.

Other Bureau of Commercial Fisheries films honored at Edinburgh in past years were The Story of Menhaden in 1951 and Outboard Fisherman U.S.A., 1956. The Whooping Crane also won an award at the 1959 Venice, Italy, International Film Festival.

Note: These films and others are available on a free loan basis. Write to the Office of Information, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

\*\*\*\*\*

#### **Sponge Film of U. S. Bureau of Commercial Fisheries Wins Recognition:**

Sponge--Treasure from the Sea, a 16-mm, sound-color film recently made available to the public.



has won an American Film Festival award. The award is a certificate showing that the film passed screening requirements for screening at the Film Festival April 19-22 at the Barbizon-Plaza Hotel in New York City. The Festival is sponsored by the Educational Film Library

Association which has its headquarters in New York.

The action of the screening committee put Sponge--Treasure from the Sea in the Blue Ribbon competition in the Agriculture, Conservation and Natural Resources category.

The picture tells the story of the natural sponge industry in the United States where it is conducted with all the old world color and culture. It shows the two methods of harvesting, hooking and "hard hat" diving; the sponge auction which features a silent auctioneer, with gestures taking the place of calls; the blessing of the waters and the diving for the Golden Cross. The center of the American sponge industry is Tarpon Springs, Fla., where sponge divers of Greek origin carry on their work in traditional style.

The film was produced by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service. It was sponsored by the Sponge and Chamois Institute and the Sponge Industry of Tarpon Springs.

Note: Prints are available on a free loan basis from cooperating film libraries throughout the country and from the Bureau of Commercial Fisheries, U. S. Department of the Interior, P. O. Box 128, College Park, Maryland.



#### **Fish Flour**

##### **INTERIOR SECRETARY LUNCHEON POINTS WAY TO END PROTEIN DEFICIENCY:**

A prelude to a program aimed at helping to end dietary protein deficiency, and which may prove a boon to peoples in underdeveloped areas, was given on April 4 at a luncheon at the Department of the Interior by Secretary Stewart L. Udall.

Secretary Udall served cookies to his guests to which had been added fish flour, a convenient supplement to diets of protein-starved persons--an innovation which many believe could change the lives of countless persons in the nations of the world. Over two-thirds of the world's population suffer from protein malnutrition.

The term "fish flour" is actually a misnomer, and those engaged in the research to produce this material in quantities prefer to call it "animal protein concentrate." It contains little or none of the carbohydrates and

starches found in grain flour. Rather, it contains up to 95 percent of animal protein. These proteins contain all of the 10 amino acids which are essential for the development of bone and muscle and for the daily maintenance and repair of bodily tissues.

The concentrate can be made from non-utilized fishes, the Department's Fish and Wildlife Service technicians report. The United States alone could easily supply from one locally available species of fish and without reference to other species of industrial fish commonly available, sufficient concentrate to treat 100 million humans with a dietary supplement level of one ounce of concentrate daily, for about a year.

The amount could be increased many times by utilization of the numerous domestic fish species which are little used or not used at all, at present. In developing countries, where many but not all of the 10 amino acids are available from vegetable protein sources, the United States production from one species of fish alone would adequately supplement the diet of 330 million humans for a year.

Major obstacles to the development of a substantial fish concentrate industry in this country is the lack of process engineering studies which would assure an inexpensive but consistently highly nutritious product. The Bureau of Commercial Fisheries, Fish and Wildlife Service, hopes to undertake such work in the near future.

The Bureau's home economists made the cookies used by Secretary Udall today. In the amounts used, the concentrate was undetectable as to taste or appearance. Nevertheless the protein concentrate added was sufficient for five cookies to provide 14 percent of the animal protein needed daily by a 6-year-old child, and 8 percent of the amount needed by a 154-pound United States adult male.

Guests at the Udall luncheon included Frank P. Briggs, Assistant Secretary of the Interior for Fish and Wildlife; Charles E. Jackson, General Manager of the National Fisheries Institute, and Harold J. Humphrey, consultant to the Food Conservation Division of the United Nations International Children's Emergency Fund. Jackson presented the cookies to Secretary Udall and explained the possibilities of the concentrate in the diet of underdeveloped nations and to people of all nations.



Secretary of the Interior Stewart L. Udall (right), Charles E. Jackson, Gen. Mgr., N.F.I. (left), and Asst. Sec. of the Interior for Fish and Wildlife Service, Frank P. Briggs (center), enjoy cookies made from fish flour at the luncheon. The "fish flour," actually an "animal protein concentrate," designed to end dietary protein deficiency, may prove an addition to menus everywhere, and a boon to peoples in underdeveloped areas.

At the fish meal meeting in Rome held by the United Nations Food and Agriculture Organization in late March several matters pertinent to the world's diet were discussed.

Lack of adequate protein in the child's diet results in failure of growth, muscular wasting, and oedema of varying degrees--the so-called "kwashiorker" of West Africa--or in "marasmus", failure of growth and wasting of tissues. The mortality rate in both instances, if untreated, is high.

The Rome meeting attempted to estimate how many human beings in the world now suffer from protein deficiency. An estimate of at least 500 million was made, including four-fifths preschool age children with most of the remainder being pregnant and nursing mothers.



### Fisheries Loan Fund

LOANS APPROVED,  
JANUARY 1-MARCH 31, 1961:

From the beginning of the Fisheries Loan Fund program in 1956 through March 31, 1961, a total of 905 applications for \$27,428,566 have been received by the Fund as administered by the Bureau of Commercial Fisheries of the U. S. Department of Interior. Of



these, 488 (\$11,649,419) have been approved, 303 (\$8,254,073) have been declined or found ineligible, 77 (\$4,752,132) have been withdrawn by applicants before being processed, and 37 (\$1,529,463) are pending. Of the applications approved, 180 were approved for amounts less than applied for and the total reduction was \$1,243,479.

The following loans were approved during January, February, and March of 1961:

**New England Area:** John Bruno & Son Co., Inc., Boston, Mass., \$15,000; Schooner Joseph S. Mattos, Inc., Gloucester, Mass., \$13,722.

**South Atlantic and Gulf Area:** Crawford Packing Co., Palacios, Texas, \$85,000; Dougherty Shrimp Co., Fernandina Beach, Fla., \$16,000; Herbert M. Storter, Naples, Fla., \$14,000; Mack Terrebone, Brownsville, Texas, \$22,500; and James E. Wade, Brownsville, Texas, \$20,300.

**California Area:** Frank Brenha, Jr., et al, San Diego, \$80,000; Roy A. Gowdy, San Diego, \$6,172; G. P. Ellington, Long Beach, \$80,000; Herbert C. Packer, Eureka, \$7,600; Donald H. Richcreek, Crescent City, \$9,950; Jose da Silva, et al, San Diego, \$80,000; and Walter E. Wallin, Eureka \$3,725.

**Pacific Northwest Area:** Edward J. Fagan, McMinnville, Oreg., \$8,489; Harold R. Jensen, Edmonds, Wash., \$3,800; Pete M. McNally, Port Angeles, Wash., \$5,500; Walter E. Nev-aril, Seattle, Wash., \$3,948; and Don Sjogren, Mount Vernon, Wash., \$6,896.

**Alaska:** Donald J. Adams, Ketchikan, \$3,050; Jesse Galloway, Ketchikan, \$2,000; Marion F. Goodrich, Wrangell, \$3,500; Edwin T. Grabowski, Seldovia, \$30,000; John-nie W. Huff, Ketchikan, \$5,500; Wilhelm Jordan, Petersburg, \$1,800; Kenneth G. Nauska, Sr., Wrangell, \$3,000; Hjalmar Savikko, Douglas, \$4,000; Annie L. Taylor, Petersburg, \$2,500; and Horace S. True, Juneau, \$4,264.



## Fishing Vessel Construction and Differential Subsidy

### FIRST APPLICATION RECEIVED:

The first application to the U. S. Bureau of Commercial Fisheries for a construction

differential subsidy to aid in the construction of a fishing vessel to be used for fishing for groundfish in New England fishing areas has been received. Assistant Secretary Frank P. Briggs announced on April 25, 1961.

The application was filed from New Bedford, Mass. The proposed vessel will be approximately 78 feet in length and is expected to cost about \$90,000.

The payment of construction differential subsidies with certain restrictions was approved by the Congress in 1960. The amount of subsidy, where applications are approved, will be equal to the difference between the cost of construction in a shipyard in the United States and the cost in a foreign shipyard, or one-third the cost of construction, whichever is the smaller.

To be eligible for a subsidy, the vessel must be designed for use in a fishery which has received a finding of injury due to increased imports. The plans and specifications must be approved by the Maritime Administrator and the Secretary of Defense. The finding of injury is made by the Secretary of the Interior except when the fishery is eligible to apply for, or has obtained, a recommendation for relief from the Tariff Commission as an "escape clause" action.

When completed, the vessel must be documented as a United States vessel, must employ only citizens or resident aliens in its crew, and must deliver its catches to a port in the United States.



## Fishing Vessel Mortgage and Loan Insurance

### CASES APPROVED, JANUARY-MARCH 1961:

The Federal Fishing Vessel Mortgage and Loan Insurance Program was implemented



the latter part of 1960 as a result of enabling legislation passed by the Congress in that year. Administered by the Bureau of Com-



mercial Fisheries, U. S. Department of the Interior, the program provides for Federal Government insurance of mortgages and loans for construction, reconstruction, and reconditioning of fishing vessels. The first insured mortgage and loan under the program was approved early this year. The mortgages and loans insured under the program during January, February, and March 1961, were:

New England Area: Major J. Casey Corporation, New Bedford, Mass., \$60,000.

South Atlantic and Gulf Area: Ric-Man Shrimp Co., Inc., Tampa, Fla., \$34,500.

Pacific Northwest Area: Joseph R. Fribrock, Seattle, Wash., \$75,000.



### Great Lakes Fishery Investigations

#### LAKE ERIE FISH POPULATION SURVEY FOR 1961 SEASON BEGINS:

M/V "Musky II" March 1961: The 1961 field operations of the U. S. Bureau of Commercial Fisheries research vessel Musky II on Lake Erie were begun on April 1. Installation of crew quarters, galley, and laboratory facilities was completed during the winter. Subsequent cruise schedules and operations will most certainly be improved as a result of these additions. The 1961 program will be largely a continuation of 1960 activities which includes the spring, summer, and fall 3-day series of trawl operations off Bono and East Harbor, periodic visits to other areas of the western basin, and biological samplings at seven established stations. In addition, the Musky II will be used for one week each month to obtain limnological data.

Unlike a year ago, the western section of Lake Erie was relatively ice-free for the opening dates of the new fishing season. Ice and weather conditions, however, delayed somewhat commercial activities to the east. High winds and rough waters, which are not unusual for the time of year, hampered fish-

ing. Landings consisted mostly of yellow perch, sheepshead, carp, white bass, and to a lesser extent, yellow pike--principally of the 1959 year-class.

A brief resumé on the early life history of various fish, as determined from records of the past year, is as follows: Studies of young-of-the-year fish in western Lake Erie in 1960 have demonstrated a rather wide divergence in growth characteristics of some of the more important species. The general hatching span for these fish covered May 1 through July 15. Major hatching periods and average temperatures for individual species were: May 1-15 (50° F.) smelt, yellow pike, and yellow perch; June 1-15 (68° F.) spot-tail shiner and trout-perch; June 15-30 (72° F.) alewife and gizzard shad; July 1-15 (75° F.) white bass, emerald shiner, and sheepshead.

Differences in lengths of newly hatched fish larvae are large and lengths of incubation periods vary widely between species. Sheepshead larvae may be only 1/10-inch long, but gizzard shad larvae may be as long as 1/4 inch. Sheepshead and emerald shiners may hatch less than 24 hours after the eggs are laid. Perch and yellow pike eggs may not hatch for as long as 3 weeks and eggs of the fall spawners (cisco and whitefish) usually require several months to hatch after spawning.

Growth for the season of these young-of-the-year fish largely terminated during the following periods: September 16-30 (70° F.) yellow perch and emerald shiners; October 1-15 (65° F.) smelt, spot-tail shiner, alewife, gizzard shad, and sheepshead; October 15-30 (60° F.) trout-perch, white bass, and yellow pike. Average lengths at the end of the growing season and weekly growth increments (in parentheses) for each species were as follows: yellow pike, 10.0 inches (0.44 inch); sheepshead, 4.5 inches (0.31 inch); alewife, 4.4 inches (0.20 inch); gizzard shad, 4.3 inches (0.28 inch); white bass, 4.0 inches (0.27 inch); yellow perch, 3.4 inches (0.20 inch); trout-perch, 3.3 inches (0.17 inch); spot-tail shiner, 3.0 inches (0.18 inch); em-



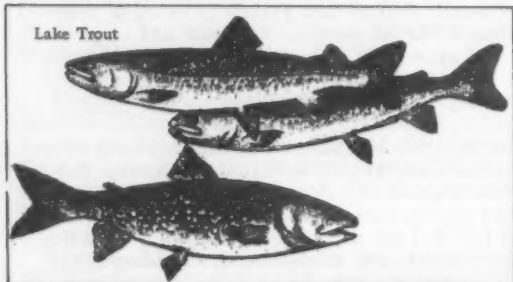
erald shiner, 2.4 inches (0.22 inch); and smelt, 2.4 inches (0.10 inch). Average weekly increments were determined by dividing the number of week's growth into the differences in length at the time of hatching and at the end of the growing season.

The age of a fish, to some extent, will determine the length of its growing season. Young-of-the-year yellow perch and yellow pike, for instance, start growth in early May, whereas growth of the older fish may be delayed until about June 1. On the other hand, young-of-the-year white bass may not hatch and start growing until July 15 but older fish will put on growth as early as June 1.

\*\*\*\*\*

#### RESEARCH VESSEL "SISCOWET" PROGRAM FOR 1961:

The 1961 operations of the U. S. Bureau of Commercial Fisheries research vessel *Siscowet* have been designed to meet the needs of individual projects of the Lake Superior research program and to continue long-term observations of environmental conditions and fish populations.



Special studies will cover problems such as early life-history observations, food-habit studies for several species, electrophoretic analyses of the coregonids and lake trout, and collection of data and materials on the spawning habits of several species. Other operations will be devoted to limnological surveys at "index" stations and systematic fishing with trawls and gill nets at various depths and locations in western Lake Superior.

A fishery survey of the Whitefish Bay region is planned. Gill nets and trawls will be fished at various depths and locations to study the abundance and distribution of lake trout, whitefish, herring, and chubs. Samples of chubs will be preserved for study in the laboratory.

A study of lake trout in the Keweenaw Bay area is also planned. Information will be gathered on the contribution of hatchery-reared fish to native stocks of young trout, and attempts will be made to evaluate the comparative survival of lake trout planted from shore with those planted offshore with boats. A study of the Isle Royale area is contemplated to assess the abundance of small lake trout and to make further collections of chubs from the region.

The annual assessment of spawning populations of lake trout in western Lake Superior will take place in October. Discontinuance of the spawn-taking operations of the Wisconsin Conservation Department makes this study of vital importance in following the status of the lake trout in Lake Superior.

Other operations will be devoted to the collection of data and materials on the life history of the common whitefish.



#### Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Biological Laboratory of the U. S. Bureau of Commercial Fisheries during January-March 1961:

##### SHRIMP FISHERY INVESTIGATIONS:

Population Dynamics: Activity during the quarter centered upon completing a detailed examination and gross analysis of the first 4 years' commercial shrimp catch statistics.

Collection and organization of various shrimp measurement data continued. Computation and analysis of factors relating length to weight, total length to carapace length, "tail" weight to total weight, etc., neared completion. While certain of these factors will primarily aid the industry in standardizing buying and selling practices, all will provide biologists and statistical agents with means for converting research data and fishery statistics to comparable units.

Bait Shrimp Production: A summary of 1960's statistics reveals that the Galveston Bay system yielded an estimated 943,000 pounds of shrimp to commercial bait shrimp fishermen. Consisting of approximately 60 percent white and 40 percent brown shrimp,

this represented an 83-percent increase over the previous year's production. Retail value was estimated at \$1.1 million.

During the first quarter of 1961, white shrimp dominated Galveston Bay's bait shrimp fishery, being infrequently supplemented by small amounts of pink shrimp and *Trachypeneus* sp. For the first time in 6 years, bait-size white shrimp were consistently plentiful throughout the winter. Catches came almost exclusively from the deep waters of the Galveston Ship Channel.

**Shrimp Migrations:** Emphasis throughout the quarter was given recovery phases of shrimp marking experiments initiated late last year. Commercial fishermen turned in 42 and 76 recaptures, respectively, from releases at Bottle Key (13,300) in November and Lower Pine Island Sound (32,900) in December. Of the Bottle Key recaptures, 10 were taken in Florida Bay within 6 miles of the release site, and 32 on the Tortugas grounds about 120 miles to the west. To date all Pine Island Sound recaptures have been taken on the southern portion of the Sanibel fishing grounds, 20-25 miles south and southwest of the release site. The results of these and previous experiments indicate that: (1) all of Florida Bay constitutes nursery area for pre-recruit segments of the Tortugas pink shrimp stock, and (2) Barnes Sound and Biscayne Bay on the east coast, and estuaries north of Cape Romano on the west coast, may be discounted as such.

The number of shrimp marking (staining) experiments that can now be carried out concurrently is restricted by the number of stains that have proved satisfactory for this purpose. Investigation has disclosed, however, that supplementary marks produced with certain machine inks can at least double present marking possibilities. Shrimp injected with Trypan blue or fast green dyes which concentrate in the gills may be given a secondary mark with black or red machine ink in the subabdominal region. The most suitable for this purpose appears to be Sanford's check-writer ink, red (No. 639), which leaves a very discrete, easily detected spot when injected under the cuticle at the base of the pleopods. It remains clearly distinct in living shrimp over periods of at least 60 days. Clearance for field use is now being solicited from the Pure Food and Drug Administration.

**Shrimp Larvae Studies:** A new phase of the shrimp larvae project was begun during the quarter. Objectives are:

1. - Delineation of penaeid shrimp spawning grounds in the Gulf of Mexico adjacent to Galveston.
2. - Determination of spawning conditions of the various species with respect to season, area, and depth.
3. - Study of the effects of environmental factors (such as temperature, salinity, and bottom composition) on the distribution, abundance, and spawning activities of penaeids.
4. - Study of seasonal and areal abundance of penaeid larvae and the importance of currents in their transport to inshore nursery areas.

The 60-foot shrimp trawler *Miss Angela* of Freeport, Tex., has been chartered for sea sampling. Four cruises at 3-week intervals have been made over an area extending from Freeport, Tex., to Cameron, La., and from 7 to 45 fathoms. Eleven stations are occupied during each 395-nautical-mile cruise. Biological sampling at each station consists of a 1-hour drag with a 45-foot flat trawl and a 20-minute step tow of the Gulf V Plankton Sampler. Hydrographic observations include vertical profiles of temperature, salinity, and current direction and velocity.

Preliminary examination of data resulting from the first three cruises (January 17-19, February 8-10, and March 28-April 3) shows:

1. - The great majority of penaeid females were undergoing some ovarian development during this season.
2. - Female brown shrimp, *Penaeus aztecus*, and rock shrimp, *Sicyonia brevirostris*, were most advanced in their sexual development.
3. - Ovaries of white shrimp (*P. setiferus*), pink shrimp (*P. duorarum*), *Sicyonia dorsalis*, and *Trachypenaeus similis* were generally less advanced in their development.
4. - The most abundant form of penaeid larvae found in the plankton samples was the mysis stage.
5. - Nauplii were taken only at 25- and 45-fathom stations.

6. - Post-larvae of the genus Penaeus were taken at a 45-fathom station some 80 miles offshore.

In attempts to rear early penaeid larvae, ripe females of Penaeus aztecus, Sicyonia brevirostris, S. dorsalis, and Trachypeneus similis were held in the laboratory. Although spawning occurred in some cases, the eggs failed to develop. One spawn of S. brevirostris took place in the recently completed recirculating sea-water system. The resulting eggs appeared relatively free of micro-predators and generally in better condition than eggs previously spawned in standing-water systems.

To complement post-larval rearing experiments, live plankton was brought in from offshore collections. An attempt is being made to develop satisfactory procedures for the description of succeeding instars of larvae obtained from these live plankton samples.

**INDUSTRIAL FISHERY STUDIES:** A total of 27 life-history samples were processed during the quarter from the dominant species group. Length-frequency and length-weight curves have been worked out for some of this group. Studies show that fish caught west of the Mississippi River Delta are larger in size generally than those east of the river. Studies on geographic differences are continuing. Length-weight relationships between individuals of spot, Leiostomus xanthurus, are scattered after 200 mm. in length for all samples worked to date. However, the croaker, Micropogon undulatus, has shown an excellent curve in the 1 year of data completed this quarter.

All specimens of all species examined show close conformity to spawning periods as described in the literature.

Routine sampling was continued throughout the quarter. A total of 78 landings were sampled. The program was reduced somewhat during March when the local plant curtailed landings to install new equipment for facilitating fish handling. Many vessels of the fleet took advantage of the respite to perform overhaul tasks which further reduced local landings.

In January a total of 577.5 pounds were sampled from 1,572,108 pounds landed. Croaker, trout, and spot constituted 88 percent by weight and species of less than 1 percent by weight were 9 percent of the total.

In February 490 pounds were sampled from 1 million pounds landed. Croaker took an unusual upturn to 72 percent by weight, while spot and trout were 10 and 3 percent, respectively. Miscellaneous species contributed 9 percent of the total.

In March croaker was somewhat more than 50 percent of the total, while trout and spot were 11 and 10 percent each. Miscellaneous species were 9 percent by weight.

The average number of species in January was 12, while in February and March it was 13 each.

Thirteen frozen fish samples taken off the Texas coast by the Bureau's M/V Oregon were processed this quarter. The long-spine porgy (Stenotomus caprinus) bumper (Chloroscombrus chrysurus), and thread herring (Opisthonema oglinum) were the dominant species, comprising by number 49 percent of the total catch.

Additional fish samples are being obtained through extended activity of the shrimp larval study project. Two random 5-pound samples are being taken at each of 11 stations which range in depth from 7½ to 45 fathoms, on a 3-week basis. Thus far, 64 such samples have been received and processed, and a total of 74 species have been identified.

Examination of plankton samples for the removal of fish eggs and larvae was continued. This phase of the larval fish study is nearing completion.

**EFFECT OF PESTICIDES ON MARINE ORGANISMS:** Results of bioassays conducted in small glass and polyethylene jars at a volume of 6 liters indicated strongly that toxic elements are partially absorbed or otherwise bound by the polyethylene. During this quarter, the acquisition of larger-capacity glass jars (40 liters) permitted a more extensive study of this problem. The hypothesis that polyethylene significantly reduces the toxicity of these chlorinated hydrocarbons tested thus far was confirmed. Pinfish (Lagodon rhomboides) exposed to DDT at a concentration of 0.05 ppm. suffered 80 percent mortality in glass jars compared to 10 percent in polyethylene vessels. At a concentration of 0.07 ppm. in glass, 100 percent mortality was noted in 10 hours. A slightly higher concentration (0.08 ppm.) in polyethylene caused only 50 percent



mortality in 48 hours. Since it has been demonstrated by others and corroborated here that at equal concentrations, solutions increase in toxicity with increasing volume (at least up to some level), an experiment was run concurrently to compare the effects of 100 liters of the 0.05 ppm. solution. Only polyethylene vessels, however, were available. Despite the fact that polyethylene reduces the toxicity of a solution, the greater volume caused 100 percent mortality in less than 24 hours, which is higher than that noted in 40 liters either in glass or in polyethylene. These problems are being considered further.

Tests of technical chlorinate hydrocarbons on postlarval blue crabs (*Callinectes sapidus*, approximately 4 mm. in carapace width) yielded the following 24-hour TLM values: DDT (0.003 ppm.), Endrin (0.01 ppm.), Dieldrin (0.05 ppm.), and Heptachlor (0.05 ppm.).

Studies of sublethal levels of pesticides on estuarine organisms were initiated this quarter. Young sailfin mollies (*Mollienisia latipinna*, 16-17 days old) were exposed to a running solution of DDT (2 parts per billion). Experimental tanks hold approximately 40 liters and new medium is added at the rate of approximately 1 liter per hour. Every 2 weeks, animals are counted, measured, and returned to the tanks. Thus far, growth and survival in the control animals have been slightly but insignificantly greater than in the experimental animals. Initial length of all animals was 11.3 mm. Studies of environmental factors that affect the toxicity of pesticides suggest that silt is important. The addition of 4 gm. of fine clay (Pennsalt Diludust) significantly reduced the toxicity of 40 liters of a 0.05 ppm. solution of DDT to pinfish. In 48 hours only 20 percent mortality was recorded compared to 80 percent in a similar concentration without clay.



## Hawaii

### COMMERCIAL FISHERIES LANDINGS, 1960:

The commercial fisheries landings of sea and pond fish and shellfish in the State of Hawaii during the calendar year 1960 amounted to 11.1 million pounds valued at \$2.7 million ex-vessel, according to the Hawaii Division of Fish and Game. Compared

with the previous calendar year, the catch showed a decrease of 5.4 million pounds (32.8 percent) in quantity and \$473,899 (14.9 percent) in value. The decrease was largely due to the skipjack tuna (*Katsuwonis pelamis*)

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Values, 1959-60

Species		1960		1959	
English Name	Hawaiian Name	Quantity 1,000 Lbs.	Value 1,000 Lbs.	Quantity 1,000 Lbs.	Value 1,000 Lbs.
<b>Ocean Catch:</b>					
Amberjack	Kahala	86	25	79	23
Big-eyed scad	Akule	293	207	156	125
Dolphin	Mahimahi	91	50	119	53
Goatfish	Weke-ula				
	Weke	141	79	127	78
	Moana				
	Kumu				
Crevalles*	Ulua	108	45	83	29
	Omitu				
Mackerel	Opelu	193	82	192	76
<b>Snappers:</b>					
Grey	Uku	46	21	46	22
Pink	Opakapaka	105	35	110	56
	Kalekale				
Red	Ulaula Koa (Onaga)	59	91	73	65
	Ulaulu (ehu)				
<b>Swordfishes, sailfishes, spearfishes, &amp; marlins</b>					
	A'u & A'u Iope	584	168	797	200
<b>Tuna &amp; tunalike fish:</b>					
Albacore	Ahi	9	3	11	2
Big-eyed & bluefin	Ahi	1,296	562	1,322	374
Yellowfin	Ahi	356	152	569	178
Skipjack	Aku	7,360	1,001	12,413	1,475
Bonito	Kawakawa	4	1	19	4
<b>Shellfish:</b>					
Crabs	Kora, Papai	14	7	8	4
Limpet	Opihi	14	6	13	8
Lobster, spiny	Uia	10	7	12	8
Octopus	Ike	5	3	4	3
Shrimp	Opae	-	-	-	-
Squid	Muhee	5	2	5	2
Turtle	Honu	4	1	-	-
Other fish & shellfish	-	297	115	346	139
<b>Total ocean catch</b>		<b>11,079</b>	<b>2,863</b>	<b>16,494</b>	<b>3,121</b>
<b>Pond Catch:</b>					
Clams	Olepe	1	-	3	1
Crabs	Kuakou, Papai, Samoan	6	3	2	1
Milkfish	Awa	8	4	32	13
Mullet	Amama	34	29	45	37
Other species	-	6	6	14	6
<b>Total pond catch</b>		<b>57</b>	<b>42</b>	<b>96</b>	<b>58</b>
<b>Grand Total</b>		<b>11,136</b>	<b>2,905</b>	<b>16,590</b>	<b>3,179</b>

landings which dropped 5.1 million pounds (40.7 percent) in quantity and \$474,225 (32.1 percent) in value. The skipjack tuna catch in 1959 was nearly 6 million pounds more than in 1958. In addition to skipjack tuna, landings of other important species which decreased substantially were yellowfin tuna (*Neothunnus macropterus*) by 212,963 pounds (37.5 percent) and black marlin (*Makaira ampla*) by 118,256 pounds (27.1 percent). Landings increased for crevalles (*Carangidae*) by 39,430 pounds (73.4 percent) and big-eyed scad (*Tachurops crumenophthalmus*) by 142,838 pounds (91.8 percent).

Note: Also see Commercial Fisheries Review, May 1960 p. 25.



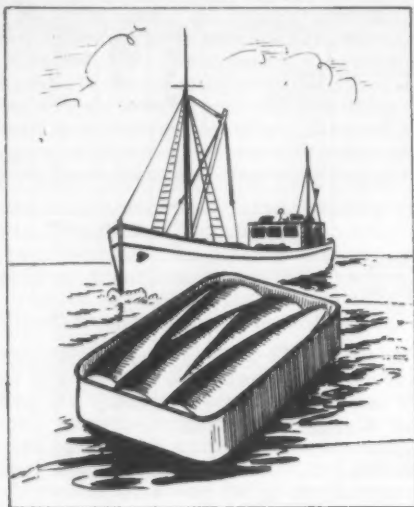
## Maine Sardines

### CANNING INDUSTRY READY FOR 1961 SEASON:

When the small herring start running along the Maine coast, 31 canneries will be



ready to convert them into sardines. Although the 1961 canning season legally opened on April 15, no significant production was expected until late May or early June if the spring runs of fish follow the same pattern of the past 10 years.



The Maine canning industry produced nearly 2 million cases (100  $3\frac{1}{2}$ -oz. cans) during the 1960 season, which is the pack goal for the plants until the closing date on December 1, 1961.

Milbridge which was recently totally destroyed by fire.

Veteran fishermen see no reason why the fish should be running in large numbers any earlier than in the past few years.

\*\*\*\*\*

#### CANNED STOCKS, APRIL 1, 1961:

Distributor's stocks of Maine sardine totaled 267,000 actual cases on April 1, 1961--15,000 cases more than the 252,000 cases on hand April 1, 1960. Stocks held by distributors on January 1, 1961, amounted to 233,000 cases, and on November 1, 1960, totaled 277,000 cases, according to estimates made by the U. S. Bureau of the Census.



Canner's stocks on April 1, 1961, totaled 506,000 standard cases (100  $3\frac{1}{2}$ -oz. cans), an increase of 109,000 cases (27.0 percent) as compared with April 1, 1960. Stocks held by canners on January 1, 1961, amounted to 1,029,000 cases and on November 1, 1960, totaled 1,258,000 standard cases.

The 1961 packing season opened on April 15, 1961, but no production was expected before late May or early June.

At the beginning of the 1960 packing season on April 15, 1960, the carryover in the

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, April 1, 1961, With Comparisons 1/

Type	Unit	1960/61 Season			1959/60 Season				
		4/1/61	1/1/61	11/1/60	7/1/60	6/1/60	4/1/60	1/1/60	11/1/59
Distributors	1,000 actual cases	267	233	277	172	197	252	235	296
Canners	1,000 std. cases 2/	506	1,029	1,258	359	235	397	843	1,001

1/ Table represents marketing season from November 1-October 31.

2/ 100  $3\frac{1}{2}$ -oz. cans equal one standard case.

Correction: In the March 1961 issue of Commercial Fisheries Review, Table 1 on page 32, the first column under "1960/61 Season" should read "1/1/61."

Sales were excellent in the early months of 1961 and the industry was reported to be in a good inventory position.

This will be the fourth consecutive season during which the State-administered quality control program has been operating, and regulations are expected to be even more strict than in the past.

An additional plant at Eastport, Maine will be in operation in 1961 but there is still some question as to the status of a plant at

hands of canners from the 1959 pack was 335,000 cases. This carryover plus the 1960 pack of 1,998,000 cases of all types of Maine sardines made the available supply as of April 15, 1961, a total of 2,333,000 cases--more than the supply of 2,171,000 cases on April 1, 1960. Canners' shipments from April 15, 1960 to April 1, 1961, amounted to 1,794,000 cases as compared with 1,774,000 cases for the same period a year earlier.

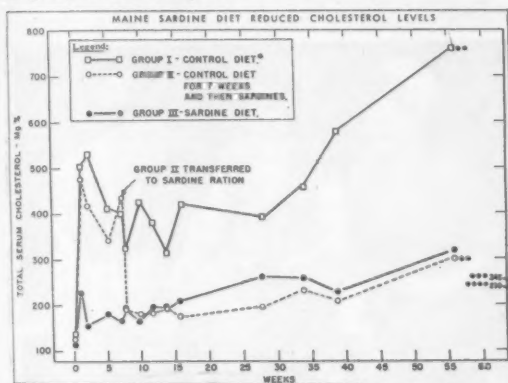
Note: Also see Commercial Fisheries Review, March 1961 p. 32.

\*\*\*\*\*

### FEEDING TESTS INDICATE VALUE AS A CHOLESTEROL DEPRESSANT:

A 55-week feeding test has shown that a diet with a Maine sardine base will greatly reduce high serum cholesterol levels in laboratory animals. The project was conducted for the Maine Sardine Council by an internationally famous research organization.

Blood cholesterol is currently considered by many leading physicians and nutritionists to be definitely related to numerous serious heart diseases affecting or killing millions of people annually.



Graph of tests showing change in cholesterol levels as the animals were fed the cholesterol-cholic acid added diets of Maine sardines versus a control ration.

The Sardine Council's Chairman states that the researchers and one of the country's top nutritionists considered the results of the test to be so impressive that they had recommended that a similar study be conducted on humans.

Examination of the animals at the end of the test showed the cholesterol level of those on the sardine diet to be less than half as high as those on a control diet with a highly saturated fat base of a commonly used non-liquid type of household fat.

Furthermore, according to the Chairman, the study showed that when a group of animals on the control diet for seven weeks were transferred to the sardine ration their cholesterol level dropped by more than 60 percent in a short time.

Numerous experts have long contended that foodstuffs with a high saturated fat content tend to favor increased cholesterol lev-

els in humans while those with unsaturated fat content, such as Maine sardines, appear to help control cholesterol levels.

A much larger than normal amount of cholesterol was added to both diets for each feeding and the serum levels for those on the control rose steadily to an abnormal high at the end of the tests. Those on the sardine ration enjoyed a steady low and more normal level.

The animals used attained an age equivalent of 50-55 years in humans by the 55th week and the tests indicated that their bodies were less able to adapt to the added cholesterol as they got older.

The tests were hailed as an important research development in the field of nutrition and may boost the consumption of Maine sardines once the results are generally known.



### Michigan

#### SMELT DIP-NET FISHING SEASON PROSPECTS POOR:

Prospects were not encouraging for Michigan's dip-net smelt season which was due to begin in mid-April in tributary streams of the Great Lakes. Winter's generally below-par snowfall points to low water levels which were expected to cut down spawning runs of smelt.



Dip-net fishing for smelt in Great Lakes.

The Great Lakes commercial catch, a good barometer of spring catches in streams, was up from 1960 during the first months of this year. However, last year's commercial take was down nearly 50 percent from the year before. During spring runs, smelt fishermen on tributary streams usually approach the annual catch of commercial fishermen in the Great Lakes.

Major upstream migrations of smelt were expected to start about April 10 and hit their peak about April 20. Exact timing of runs may vary considerably from stream to stream or even with the same stream, depending upon water temperatures. Smelt begin their upstream journeys when water temperatures rise to about 40° F.

Heaviest runs normally occur in streams which flow into the northern third of Lake Michigan, including the Green Bay region. Streams and cuts that drain into Saginaw Bay generally yield good returns. The smelt catch has picked up somewhat during recent years in Lake Michigan tributaries along the southwestern part of the State and in streams of the northeastern Thumb area.

Hand nets not more than five feet in circumference may be used to dip smelt from March 1 to May 31 in waters designated by the Michigan Conservation Department.



## National Fisheries Institute

### 16th ANNUAL CONVENTION:

Representatives of the United States commercial fishery industry, meeting at the 16th Annual Convention of the National Fisheries Institute (NFI), at Washington, D. C., April 14-18, learned that domestic consumption of edible fishery products will climb to nearly 6 billion pounds (round weight) a year by 1975. According to U. S. Bureau of Commercial Fisheries estimates, this will be an increase of about 1.5 billion pounds over the 1960 fishery products consumption.

Nearly 800 delegates from the commercial fisheries and allied industries attending the 4-day convention heard addresses by NFI officers, Government officials, and nutritional specialists. Among the principal speakers who addressed the convention were Secretary of Interior Stewart L. Udall, As-

sistant of Interior for Fish and Wildlife Frank P. Briggs, and Dr. Frederick J. Stare, Chairman of Harvard University's Department of Nutrition. The theme of one of the General Sessions was "New Frontiers in Food Service." Another General Session consisted of two panel hours: "New Product Opportunities Build on Research" and "Implementing Industry Voluntary Operating Practices." Also, on the agenda were meetings covering food services in restaurants and other dining-out places, outdoor cookery of seafoods, advances in technological research, and handling and distribution of frozen fishery products.



Fig. 1 - At the fishery cook-out demonstration during the National Fisheries Institute Convention on the hotel terrace: Congresswoman Gracie Pfoz, Idaho; Congresswoman Iris Faircloth Blitch, Georgia; Mrs. Rose Kerr, Chief of the Home Economics Unit, U. S. Bureau of Commercial Fisheries.

During the convention, a number of other fishery associations had meetings: The National Shrimp Congress; American Seafood Distributors Association; Shrimp Association of the Americas; National Shrimp Breeders Association; as well as the Fish 'N Seafood Promotions Division of NFI and Fish 'N Seafood Parade.

The Fishery Market News Service of the U. S. Bureau of Commercial Fisheries established a temporary office at the convention hotel where information on landings, receipts, prices, and market data on fishery products was received by teletype from the Market News Service field offices, and made available to those attending the convention.

**Make America More Conscious of the Value of Fishery Products:** The theme of Secretary of Interior Udall's address was

that "no industry can consider itself an isolated or solitary unit. Each industry affects and is affected by industries in other countries, and that the major task ahead is fitting the American fishing industry into world economics." The Secretary told his audience that one way to improve the standing of the fishing industry in this country and put it in a stronger position in the international field would be to make America more conscious of the value of our product--not only in terms of advertising, but in terms of research. This research, he declared, should put the industry in a more competitive position by increasing the variety of the products and by improving techniques in their preparation and marketing. The Secretary conceded that "there may be times when the industry feels that the Nation does not appreciate its problems or its efforts... But I want to impress this point upon you. This Administration is deeply concerned over the problems of the fishing industry and is trying to render maximum service. America has many problems of its own--internal and external. It cannot solve one set of problems without first studying the possible effect on others. America itself is adjusting to fit into the world economy," he declared.

**Harvesting Crops from the Sea a Conservation Challenge:** In his address, Frank P. Briggs, Assistant Secretary for Fish and Wildlife of the Interior Department, stated that he believed the task of harvesting the crops from the seven seas as one of the greatest conservation challenges of all times. The big conservation challenge for the ocean conservationists, he added, is an interlocking problem of fishery biological and technological research, exploratory fishing and gear research, and market research and market development. In part, Assistant Secretary Briggs stated:

"...The goal, it appears to me, is to learn all we can about the fishes of the sea and the various natural phenomena which affect them in order that we may have the maximum sustained yield from the sea to give the people of the world the food they need. Second to this, but of top importance, is the orderly harvest of those resources so that each nation will get its fair share of the resources.

"This puts conservation on an international footing far greater than at any other time in history..."



Fig. 2 - Frank P. Briggs, Assistant Secretary for Fish and Wildlife, U. S. Department of the Interior, addressing the Sixteenth Annual Convention of the National Fisheries Institute in Washington, D. C., April 15.

The Assistant Secretary then pointed out that the conservation movement is to accomplish three things--(1) assure the world the highest sustained yield of our ocean food resources; (2) arrange for orderly harvest and utilization thereof; and (3) finally, see that the American fishing industry gets a fair share of this harvest and the benefits thereof.

**Fishing Industry Must Meet Challenge to Supply Food from the Sea:** T. D. McGinnis, President of the National Fisheries Institute, declared on April 10 in opening the convention: "The nation's fisheries must be ready to meet the challenge set forth in President Kennedy's recent plea for appropriations of \$97.5 million to study means of feeding future populations with foods from the sea." McGinnis cited President Kennedy's letter of March 29th to Vice President Johnson, in which the President noted:

"The seas offer a wealth of nutritional resources. They already are a principal source



of protein... Within two decades our own nation will require over 1,000,000 more tons of seafood than we now harvest."



Fig. 3—National Fisheries Institute election at the Convention, April 18, Washington, D. C. left to right: Louis Vitale, Los Angeles Smoking and Curing Co., newly-elected treasurer; T. H. Shepard, Jr., Schulman-Shepard, New Orleans, new secretary; T. D. McGinnis, Virginia Seafoods, Irvington, retiring president, who becomes chairman of the board; Harvey Bundy, Jr., Gorton's of Gloucester, new president; Charles E. Jackson, general manager of N.F.I., Washington, D. C.

America's fishing industry, McGinnis said, "is meeting the challenge right now by developing quality standards, conserving our resources, and designing boats and fishing equipment that will catch fish from ocean depths as yet unfished."

Producing Fish at a Price Competitive With Foreign Products Is Principal Fish Industry Problem: The principal problem facing the United States commercial fishing industry is to produce fish at a price competitive with foreign products, Donald L. McKernan, Director of the U. S. Bureau of Commercial Fisheries, told the convention. He said that research directed at learning more about fish resources offers the surest hope of meeting foreign price competition. In addition, he said, product research designed to provide a greater quantity, quality, and variety of fish is required if fish dishes are to compete with other products for the American dinner table. He also emphasized that in addition to this research effort, the Government must also work closely with private industry to develop broader markets for fish.

McKernan said he has confidence in the future of the fish industry because of such recent important developments as: (1) Increased interest throughout the world in fish product research. (2) Increased world-wide awareness of the need to make available high protein fish products to people in many na-

tions now suffering from low-protein intake. (3) A growing awareness in fishing industries throughout the world of the need to develop more economical means of catching, processing, preparing, packaging, and distributing fish products.

Fish in the Diet Four Times a Week Recommended: "Two-thirds of the males in this audience and on this dais will die of arteriosclerosis," Dr. Frederick J. Stare, Chairman of Harvard University's Department of Nutrition, told the members of the fishing industry attending the convention.

Dr. Stare, who is Chairman of the Heart Institute, told his audience of the causes of arteriosclerosis, including cholesterol in the blood, obesity, heredity, and high blood pressure. He then emphasized the fact that fish and seafoods included in the diet will prevent many of these causes.

"We recommend that fish be included in the diet four times a week," he said, and then went on to tell why. "Seafoods fulfill the modern conception of good nutrition. They are high in the protein that contains the important amino acids, high in mineral content, low in fats--and those fats that fish do have are of the polyunsaturated type."

He went on to explain that saturated fats are the most suspect in causing cholesterol in the blood, which in turn causes atherosclerosis, the form of arteriosclerosis responsible for strokes and heart disease. By eating foods containing polyunsaturated fats, the chance of building too much cholesterol in the body is cut down.

Dr. Stare also stressed the desirability of keeping weight down. "One third of the nation's population," he said, "consumes too many food calories a day." Most seafoods are low in calories--another reason for including fish and shellfish in the diet often.

He urged that the fishing industry promote its products so that Americans will know why they should eat more fish. He also urged that private individuals, industries, and associations appropriate funds for research and help doctors, scientists, and technologists in their search for ways to cut down the incidence of heart disease and hardening of the arteries.

"New Frontiers in Food Service" Panel Discussion: "New Frontiers in Food Service"



was the theme of a panel discussion at a general session of the convention

A panel of five guest speakers were introduced by the chairman of the Institutional Food Day Committee. The opening speaker, president of a food service company in Philadelphia, spoke on "Catering and In-Plant Feeding." He was followed by the president of a vending company of Washington, D. C., who spoke on "Vending and In-Plant Feeding." The "School Lunch Program" was covered by a speaker from the U. S. Department of Agriculture; the Director of Food Service for the University of Maryland spoke on "College and University Food Services." The final speaker was a dietetic specialist for the Veterans Administration Hospitals, who discussed "Veterans Administration Hospitals."

After each 5-minute speech the meeting was open first to questions from a "discussion panel" of ten fishing industry members, and then to questions from the floor.

The president of the Philadelphia food service company pointed out that, "No industry has made such conspicuous progress" in developing fish products for the institutional market. He reminded the audience that the future offers tremendous opportunities for new labor-saving foods. He recommended more standardization and more precise specifications of products to encourage their use in the quantity-food service field.

All the speakers stressed the importance of learning more about the needs and problems of the specific markets they were interested in selling to. The president of the Washington, D. C., vending company reminded the audience that vending is still in the pioneering stage and the fishing industry can participate in its development. The Agriculture Department speaker recommended that the State School Lunch Directors could offer expert advice and suggestions for those N.F.I. members interested in supplying fish for the 13½ million school lunches served every day. Finally, creativity and imagination were stressed as important factors in encouraging customers in all types of quantity-feeding operations to order and eat more fish products.

Shrimp Continues to be the Favorite Shellfish in U. S.: Shrimp continues to be America's favorite shellfish dish in 1960, according to the President of the Shrimp Association of the Americas. Reporting to the Asso-

ciation's Board of Directors' meeting in conjunction with the 16th Annual Convention of the National Fisheries Institute, he noted that the American people consumed more than 260 million pounds of shrimp (heads-off) last year, with nearly 60 percent of the total representing domestic consumption.

The Shrimp Association President said that one of the most important recent trends in the group's industry was the growing market for peeled and deveined shrimp. He predicted that the Association and the shrimp industry would have to support an aggressive publicity-promotion effort in the years ahead if the shrimp industry is to remain the Nation's most valuable fishery.

Resolutions Adopted by Convention: The following resolutions were adopted by the convention:

1 - Resolved that the National Fisheries Institute reaffirm its vigorous support of the exemption from ICC regulation of motor vehicles transporting fresh and frozen fishery products in interstate and foreign commerce, and otherwise preserve the flexible distribution system which is vital to the continued expansion of the fishing industry.

2 - Resolved that the National Fisheries Institute, in annual convention assembled, in Washington, D. C., April 18, 1961, petition the President and the Congress that adequate funds be made available to the Department of the Interior for the undertaking and pursuit of comprehensive time-temperature tolerance studies on frozen fish and shellfish during the coming fiscal year.

3 - Resolved that the Fish and Wildlife Service be requested to consider the feasibility of going one step further than exploration of new fishery resources and seek ways to solve technological and practical problems involved as an aid to industry.

4 - Whereas action has been taken recently, and in the past, by the Executive Branch of the Federal Government which has been injurious to segments of the fishing industry of the United States; and whereas such action has been taken without consulting the fishing industry and its representatives in Congress; now, therefore, be it resolved that the National Fisheries Institute, on behalf of the fishing industry of the United States, register protest against such

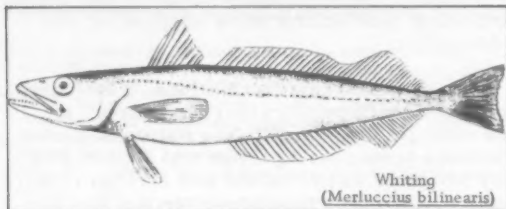
action by the Federal Government and request that in the future an opportunity for a hearing be provided before action is taken.



### North Atlantic Fishery Investigations

#### VERTICAL MOVEMENTS OF WHITING STUDIED:

M/V "Delaware" Cruise 61-4 (March 17-27, 1961): A survey of the vertical movements of whiting (*Merluccius bilinearis*) conducted on the fishing grounds off the Middle Atlantic Coast by the U. S. Bureau of Commercial Fisheries research vessel Delaware, indicated that the whiting remained on or



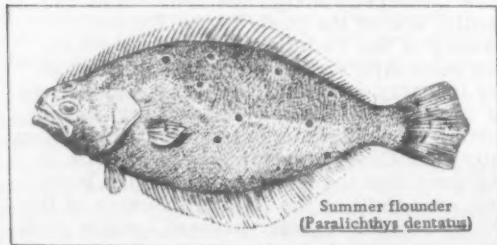
Whiting  
(*Merluccius bilinearis*)

near the bottom both day and night. Large quantities of whiting were taken with the otter trawl during daylight bottom fishing. However, only a few whiting were caught during night fishing in mid-water depths. During the cruise, hydrographic data were collected throughout the area under study.

\*\*\*\*\*

#### FLUKE TAGGED OFF MIDDLE ATLANTIC COAST:

M/V "Delaware" Cruise 61-5 (March 30-April 7, 1961): About 1,800 fluke or summer flounder (*Paralichthys dentatus*) were tagged on the Middle Atlantic fishing grounds by the U. S. Bureau of Commercial Fisheries research vessel Delaware. The fluke is the most important flatfish species



Summer flounder  
(*Paralichthys dentatus*)

in the commercial fisheries of the Middle Atlantic area.

In addition to tagging operations, data were collected on various phases of the life history of this species. The survey will aid the biologists to determine the seasonal movements, growth rates, and population units of the fluke found off southern Massachusetts and New York.



### North Pacific Exploratory Fishery Program

#### PELAGIC TRAWL-GEAR DEVELOPMENT:

M/V John N. Cobb Cruise 49: Initial underwater observations made by a U. S. Bureau of Commercial Fisheries staff member, with the assistance of master divers from the U. S. Naval Torpedo Station at Keyport, Wash., indicated a need for extensive modifications to the net design, during an 8-week pelagic trawl-gear development cruise completed April 6, 1961 by the Bureau's exploratory fishing vessel John N. Cobb. Tests and trials were made in the vicinity of the San Juan Islands, Georgia Straits, and off Cape Flattery.

Observations conducted after modifications were performed revealed that desired improvements in the net's performance had



Hauling in the midwater trawl net aboard the John N. Cobb.

been attained. All of the approximately one million meshes in the net were observed to be fully opened forming mesh configurations varying between 60-degree "diamonds" and 90-degree squares.

A maximum towing speed of 2.9 knots created an expansion force sufficient to cause the net to assume a near circular cross section. Webbing seams throughout the net followed straight lines of configuration indicating equalization of strain. Underwater photographs taken during the cruise depict the gear's performance.

A horizontal opening of 80 feet and a vertical opening of 90 feet was achieved using newly-designed hydrofoil doors measuring approximately 5 feet by 8 feet in conjunction with patented "phantom" trawl otter boards. Many adjustments and trials were made with the unique four-door hook-up before the maximum net opening was achieved.

Offshore fishing trials with the new gear rigged to tow with the float line on the surface were limited to eight drags, which gave indications of the net's ability to catch many varieties of fish. Small catches of salmon, ranging in size from fingerling up to 8 pounds, were made repeatedly. One drag produced 11 king salmon (*Oncorhynchus tshawytscha*). Other fish taken by the net include: silver salmon (*Oncorhynchus kisutch*), surf smelt (*Hypomesus pretiosus*), anchovies (*Engraulis mordax*), herring (*Clupea pallasii*), sand sole (*Psettichthys melanostictus*), English sole (*Parophrys vetulus*), starry flounder (*Platichthys stellatus*), pompano (*Peprilus similimus*), ling cod (*Ophiodon elongatus*), capelin (*Mallotus catervarius*), electric ray (*Tetranarce californica*), tom cod (*Microgadus proximus*), dogfish (*Squalus acanthias*), true cod (*Gadus macrocephalus*), hake (*Merluccius productus*), rattfish (*Hydrolagus colliei*), shrimp (*Pandalus jordani*), rex sole (*Glyptocephalus zachirus*), whiting (*Theragra chalcogramma*), butter sole (*Isopsetta isolepis*), squid, and two varieties of rockfish (*Sebastes flavidus* and *Sebastes entomelas*).

Mid-depth and additional surface trials are to be conducted during July and August.

\*\*\*\*\*

#### BOTTOM FISH TRAWLING EXPLORATION OFF OREGON COAST:

M/V "John N. Cobb" Cruise 50: An 8-week exploratory trawling cruise for bottom fish

in cooperation with the Oregon Fish Commission was scheduled for the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb from April 24-June 16, 1961. The area of operations was offshore from Newport to Coos Bay, Oreg.

Purposes of the cruise were to locate new trawling grounds and to evaluate the commercial potential of bottom fish inhabiting such grounds. Biologists from the Oregon Fish Commission planned to tag flounders and rockfish to study their rates of growth and migratory habits.

Sonic equipment was used to survey the bottom and a standard otter trawl net was to be towed over grounds indicated by the sonic gear as being trawlable. Catches made by the net were to be examined to assess the commercial fishing potential of the region.

#### Oceanography

##### CALIFORNIA INSTITUTION RECEIVES GRANT FOR MARINE RESEARCH VESSEL:

A \$462,945 grant to Stanford University of California, awarded by the National Science Foundation (NSF), will enable Stanford's Hopkins Marine Station to convert a two-masted schooner long owned by philanthropist George Vanderbilt to a modern sea-going marine research vessel that will be the largest sailing ship in the world used for scientific purposes.

The grant provides for converting and outfitting the steel-hulled, 172-foot vessel, as well as for maintenance and operation during a subsequent three-months shake-down cruise. When this is accomplished, the vessel, named the Pioneer and currently the largest private sailing vessel under United States registry, will be used on a year-round schedule of research and graduate student training. While the vessel will then be capable of operations almost anywhere in the world, it is anticipated that the major effort will be directed toward investigations in the northeastern Pacific Ocean.



The Pioneer was offered by the former owner as an outright gift to Stanford University, provided that support became available from other sources for its conversion and operation as a facility for research and graduate training in biological oceanography. The National Science Foundation has provided this support in the form of the announced grant, and it is anticipated that further support will facilitate operation and maintenance in the future.

With the acquisition and operation of the Pioneer, the Hopkins Marine Station, located at Pacific Grove, Calif., will be taking its first excursion into open-ocean biological oceanography. Owned and operated by Stanford University and an integral part of the University's Department of Biological Sciences, Hopkins was established in 1892, making it the oldest marine station on the West Coast and the third oldest in the country, yielding in age only to Woods Hole (1888) and Cold Spring Harbor (1890). It has retained its traditional emphasis on marine biology rather than on physical or chemical oceanography.

The Pioneer will be used on a continuing schedule for research and graduate training, with functions analagous to those of a biological field station. Its participants, however, will be free from narrow geographical limitations, able to work in various climatic areas, and be afforded a much needed opportunity for experience on the high seas. Although the major effort of the ship's operation will be in the northeast Pacific, the surveying of poorly known portions of the world's oceans is also contemplated. The working time of each year will be divided into four terms of about ten weeks each, roughly corresponding to academic quarters. This will leave several weeks between terms and allow at least a month for an annual overhaul during September. Most of each term will be spent at sea.

The Pioneer will be staffed originally by 3 senior scientists (faculty members) and 12 junior scientists (graduate students) recruited from universities and scientific institutions throughout the United States.

On leaving port at the beginning of each term, the vessel will embark on a basic plan of surveying a section of the ocean. Biological specimens will be collected at all depths and physical and chemical characteristics of the water will be investigated at all

stations. Data and collections gathered will be available to any qualified scientists wishing to study them.

Under the direction of the senior scientists, the junior scientists will assist in handling the many diverse types of gear, keeping the biological log, sorting and cataloguing biological collections, making physical observations and chemical determinations, and preparing data in an attempt to correlate results of their investigations. Field and laboratory work will be supplemented by a series of daily lectures and each student will be required to submit a final report on his activities during the term.

The number of oceanographic problems open to attack from a vessel such as the converted Pioneer are limited only by the imagination and ingenuity of the scientific staff. They include such things as studies of oceanic food chains, niche specialization, and competition among pelagic organisms; studies of the biological economy of the deep-sea benthos and of the functional anatomy of oceanic forms, and investigations of the reproduction and development of deep-sea animals.

The entire scientific program aboard the Pioneer will be under the supervision of the Chief Scientist who is Assistant Director of the Hopkins Marine Station, Professor of Biology at Stanford University, and principal investigator of NSF's grant to Stanford. He will be charged with the conversion and equipping of the vessel and with the development of the program, including selection of faculty members and students.

The Pioneer has a 28-foot beam and a draft of 16 feet. She was built in 1927 at a cost of \$1.4 million. In 1938, she changed ownership, was renamed the Pioneer and was used to collect marine biological specimens for various museums. During World War II, she was used as a training ship by the U. S. Navy. Exploratory work in the Pacific accounted for most of her postwar Activity. Since 1951, the Pioneer has been "laid up" afloat at Newport Beach, Calif., but maintained in excellent condition.

While the vessel has in the past been used for biological investigations, these have not been of as extensive and intensive a character as now contemplated. With the aid of an earlier NSF grant, the Pioneer



was the subject of a preliminary feasibility study when it was found that with certain alterations and installation of the necessary specialized equipment, the vessel would be suited for use as a floating laboratory.

Notable additions and conversions will include dry and wet laboratories on the weather deck, an A-frame for trawling, and three oceanographic winches. Electrical, radio, sonar, radar, loran, and depth-recording equipment will also be installed. Main deck modifications will be aimed at consolidating and maximizing the living quarters space and arranging convenient storage space for scientific gear. All machinery will require complete overhauling and one of the present 60-kilowatt Diesel generators will have to be replaced by a 75-kilowatt unit.

In addition, hydrographic, scientific, diving, photographic, and general equipment and supplies will be installed, making the vessel a completely operational biological laboratory ready for her shakedown cruise approximately six months after the onset of conversion activity.

The *Pioneer's* main engine is a 400 brake horsepower Diesel. She is equipped with a gyro compass, a 500-gallon-per-day freshwater evaporator, a 7½-ton air conditioning system, and a 7½-ton refrigeration plant. With a capacity of 6,000 gallons of fuel oil, 250 gallons of lubricating fuel, 12,500 gallons of fresh water, and existing accommodations for 34 persons, she has a range of approximately 4,000 miles and a speed of 7-8 knots.

\* \* \* \* \*

#### COMMERCE DEPARTMENT ANNOUNCES FIRST OCEAN-WIDE SURVEY:

An entirely new approach to deep-sea oceanography will be tested this year when the Coast and Geodetic Survey ship *Pioneer* sails from San Francisco to its working area in the North Pacific Ocean, the Secretary of Commerce announced April 9, 1961.

The 311-foot *Pioneer* was expected to get under way early in April and begin a systematic study of 3 million square miles of ocean between the Hawaiian Islands and the Aleutian Islands. This marks the first serious attempt by the Government to study wide ocean areas with systematic, closely-spaced observations encompassing nearly all aspects of oceanography.

The President recently asked Congress for additional funds to spend on a national oceanography program, in order that more comprehensive surveys, such as this one, may be undertaken. The Coast and Geodetic Survey will provide the necessary leadership to implement the Department of Commerce phase of the oceanographic program. The pilot project

will be followed by more comprehensive programs as facilities and personnel are expanded to meet developing requirements.

Operating out of Alaska and Hawaii, the *Pioneer* will navigate along a series of north-south lines spaced 10 miles apart across an area about 300 miles wide and 2,000 miles long. The first line is planned to follow a course 10 miles east of the 158th meridian, commencing at a point just south of the Alaska peninsula and extending southward to the Island of Oahu, Hawaii. Subsequent lines will move eastward during the 1961 season.

The project ultimately will extend from the Hawaiian Archipelago to the Aleutian Islands and from the 153rd meridian westward to the 180th meridian. Ocean surveys of this magnitude have never been attempted before. In the past, oceanographic expeditions have been limited to relatively isolated reconnaissance lines or have concentrated on one particular phase of oceanography related to a specific research problem.

A systematic survey of the oceans is possible today with the development of modern techniques, equipment, and data processing. The *Pioneer* will be fitted with Loran C positioning equipment for control purposes. Anticipated range of this system is 1,500 nautical miles for ground waves and 3,000 nautical miles for sky waves. Accuracy of position is reported to be 1,000 feet at 1,000 miles using ground waves. Loran C Stations in the Hawaiian Islands are not yet operational. Work during the first part of the season will be limited to that area effectively covered by the Aleutian Loran C control system.



The 311-foot *Pioneer* is one of the largest ships in the Coast and Geodetic Survey fleet.

The first phase of the survey will include a continuous profile of the ocean bottom obtained with a precision depth recorder, a continuous profile of the total magnetic field made by a towed Varion Proton Magnetometer, regular gravity observations by a La Coste-Romberg gravity meter, regular meteorological balloon releases, and a sea-water temperature observation every two hours. Aboard the *Pioneer* during this phase will be geophysicists from the U. S. Geological Survey and the Coast and Geodetic Survey, a meteorologist from the U. S. Weather Bureau, oceanographers from the Coast and Geodetic Survey, and if present plans materialize, student oceanographers from one or more universities. This is in addition to the 90-man crew of the *Pioneer*, including 21 commissioned officers of the Coast and Geodetic Survey.

Additional observations at predetermined locations will be made during the second phase beginning in September. At these locations bottle casts will be made for temperature, salinity, dissolved oxygen, and such other variables as the cooperating agencies may wish to measure. Sediment cores will be made at each station, and the U. S. Geological Survey will process this sediment data. Plankton tows are planned with the U. S. Bureau of Commercial Fisheries supplying biologists and equipment. Current measurements are planned in the Alaska Boundary Current. These oceanographic observations will be spaced along a course north from the Hawaiian Islands to the Aleutian Trench,



west along the axis of the trench to turn south in the area of Adak, and proceeding past Midway Island to 23 degrees 30 minutes north, thence east to Hawaii.

The Committee on Oceanography of the U. S. National Academy of Sciences-National Research Council proposed this survey approach to oceanography in Chapter 9 of its report, "Oceanography 1960-1970." This report recommends an ocean-wide survey with all maritime nations cooperating. If the job is ever to be completed, it must obviously be an international effort of formidable proportions. The Coast and Geodetic Survey in the *Pioneer* surveys is undertaking a trial run to see how much one ship can accomplish, to see what observations should be undertaken, and to see if the results justify the effort.



## Oregon

### OVER 11 MILLION SALMON RELEASED IN STATE'S WATERS:

The release of over 11 million yearling salmon from Oregon Fish Commission hatcheries early this year has given the State's fish population a hearty boost, according to the Director of Fish Culture for the Commission. The young salmon were started on a "wet" ration utilizing a pasteurized fishery byproduct. After about two months, they were placed on the recently-developed Oregon moist pellet, a nutritionally-complete ration developed in cooperation with Oregon State University scientists. The yearling fish were in prime physical condition at the time of release, the Fish Commission Director stated.

Being held at Fish Commission hatcheries for later release in Columbia River tributaries are 81,000 steelhead yearlings.



## Oysters

### CELL STRUCTURE OF PACIFIC OYSTERS TO BE STUDIED:

What happens to the cell tissue of sick oysters will be studied by scientists of the University of Washington College of Fisheries under an initial \$10,000 research grant from the U. S. Fish and Wildlife Service.

This will be the first systematic study ever undertaken of alterations in the cell structure of oysters under various environmental conditions created by controlled laboratory experiments, according to the principal investigator at the College of Fisheries.

Results of the research are expected to lead to more productive oyster cultivation in the Pacific Northwest by providing a better understanding of abnormal changes that occur in oyster tissue under varying conditions.

The oyster pathology study will be conducted through the Fisheries Research Institute, the research arm of the College of Fisheries. The grant covers the first year of a proposed three-year program.

In the research, oysters of several species will be subjected to a series of experiments involving changes in environment, such as the effects of varying salt and oxygen concentrations in water, extremes of water temperature, chemical irritants in the water, physical injuries to the oysters, and diseased tissue.

Cell changes caused by these variations will be studied at various stages through post-mortem examinations.

When it is possible to recognize the relationship between abnormal cell conditions and specific abnormalities in environment, it will be possible to diagnose the causes of oyster mortality more precisely, the investigator explained.

Although the University of Washington has received many contracts for specific research projects from the U. S. Fish and Wildlife Service, this is the first grant the Service has ever awarded to any institution in support of an investigation in a general field of research.

The University's College of Fisheries principal investigator, an authority on oysters and other invertebrates, also is conducting significant studies on shellfish mortality and environment under grants from the National Institutes of Health and Initiative 171 funds.

In the new project, he will be assisted by a graduate student in the College of Fisheries and a laboratory technician.



## Salmon

### KING SALMON EGGS SENT BY WASHINGTON STATE TO JAPAN HATCH SUCCESSFULLY:

Chinook or king salmon originating from the State of Washington were swimming in Japanese streams this spring when the product of 100,000 chinook salmon eggs sent to Japan in November 1960 by that State were released from salmon hatcheries in Japan.

The Washington Fisheries Director received a letter from the President of the Japan Salmon Resource Conservation Association in Tokyo, saying that the experimental shipment of eggs showed a high degree of success in survivals.

He stated that the eggs arrived by air freight in perfect condition, with virtually no mortalities. The eggs were hatched in three salmon hatcheries and the young have now attained the feeding stage with only a two-percent loss.

The chinook eggs were distributed as follows: Chitose salmon hatchery, Hokkaido, 50,000; Tsugaruishi salmon hatchery, Iwate Prefecture, 25,000; and Otsuchi salmon hatchery, Iwate Prefecture, 25,000.

The shipment of 100,000 eggs was the second lot the Washington Fisheries Department has sent to Japan to aid that country in efforts to create runs of chinook salmon. The first lot was sent in 1959.

\*\*\*\*\*

### TEST FISHING IN COLUMBIA RIVER AIDS MANAGEMENT OF RESOURCE:

How many fish are there in the Columbia River's current spring chinook or king salmon run? When will the peak of the spring run hit any particular part of the river? Oregon Fish Commission and Washington Department of Fisheries biologists are trying to find the answers to these and other questions of major importance in properly managing the Columbia River system's salmon resources.

Currently in operation is a run-sampling gill-netting program now in its third year with an Oregon Fish Commission crew working in the vicinity of Woody Island some 15 miles above Astoria and a Washington Department of Fisheries crew fishing in the Corbett area below Bonneville. No hit-or-miss proposition, the fishing activities and equipment must be so standardized that day-to-day and year-to-year information is

comparable. This net fishing data, as well as other information, will provide a basis for setting commercial gill-netting seasons in keeping with the best interest of the resources.

Fish taken alive from the test fishing net are marked with a plastic dart-type tag and released for subsequent recovery information. Those killed during the operations are placed in cold storage in Astoria for distribution by the Oregon State Board of Control to various state institutions.

Results of the test fishing at Woody Island thus far show a sharp increase in the number of chinook taken between March 15, 1961, when 13 were landed, and April 6 when 67 chinook were taken. Based on previous years tagging observations, this increase in numbers of salmon caught is probably the result of Willamette River spring chinook passing through the lower Columbia River. A later peak in the catch is expected as fish bound for upriver spawning tributaries pass the Woody Island section.

The Oregon Fish Commission's director of research pointed out that spring chinook of the Willamette River stock for the most part pass up the Columbia and into the Willamette before the commercial season opens. He indicated, however, that a considerable fluctuation in fish runs necessitates a continuing program of sampling so that fisheries biologists remain current on any significant changes in anadromous fish populations.



## South Carolina

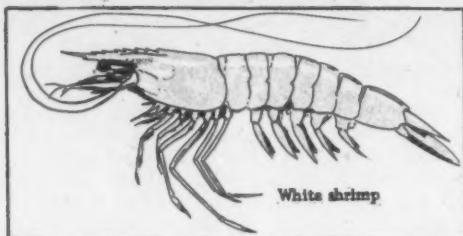
### FISHERIES BIOLOGICAL RESEARCH PROGRESS, SEPTEMBER 1960-MARCH 1961:

The following is a report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for September 1960 through March 1961.

**Shrimp Research:** Experimental trawl data collected during the last quarter of 1960 showed that white shrimp were slightly more abundant than in the same period of 1959. Croakers were much less numerous, but spot were three times more abundant during the 1960 quarter.

On the whole, 1960 was a good year for white shrimp, judging from experimental catch data at Bears Bluff Laboratories. White shrimp had a good spawning in the summer of 1960 and were more abundant in

1960 than during the last several years. Cast net records showed that white shrimp were about 5.5 times more abundant in the October-December quarter of 1960 than for the same period in 1959. Small white shrimp, which will form the bulk of the 1961 spawning stock, were unusually plentiful in inshore waters through December 1960.



Catch data for fish and shrimp in experimental trawl drags during January-March of 1961 were tabulated for comparison with the same period in 1960. Results showed that spot were slightly more abundant at regular stations during the 1961 quarter, but croakers had decreased by almost five times in that period as compared with 1960. White shrimp, averaging about 60 count, heads on, were quite common through March of 1961, and were slightly more abundant than during the same period in 1960. These shrimp are remnants of last year's crop which survived the winter and will enter the commercial catch this spring. Judging from the numbers of white shrimp this early in the season, 1961 may well prove to be another successful year for this species.

Young menhaden, 3-6 inches in length, were very abundant in experimental drags, particularly in St. Helena Sound and North Edisto River. In those areas, menhaden were approximately 20 times as abundant through March of 1961 as in 1960, and about 10 times more numerous as during that period in 1959.

Plankton tows were continued as a part of the regular shrimp survey program. Experimental plankton tows indicated a scarcity of postlarval brown shrimp this year. These postlarvae were over 10 times more abundant at coastal river and sound stations during January-March of 1960 than in 1961. The situation might improve, however, since the recruitment period for brown shrimp postlarvae extends into May.

Larval and postlarval spot were quite plentiful in inshore plankton tows. The abun-

dance of small spot during the quarter was about equal to, and in certain areas, greater than for the same period in 1960. This would indicate that spot will remain plentiful in coastal waters for the next year or so, providing no great mortalities occur in the meantime. Larval croakers, on the other hand, were scarce in plankton tows in both 1960 and 1961. Judging from this, plus the fact that croakers have shown a decline in experimental trawl drags, the outlook for this species in 1961 seems rather poor.



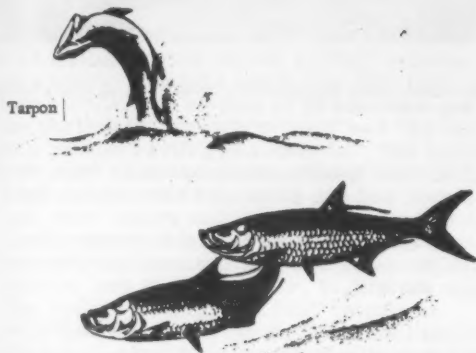
**Blue Crab Studies:** Regular experimental trawl hauls in September-December 1960 indicated that the relative abundance of crabs in the quarter was about the same as in the same months of 1959.

At the eight stations where regular trawl samples are taken, blue crabs, mature and immature, were more abundant during the first quarter of 1961 than during the first quarter of 1960. Mature crabs were 34 percent more abundant and immature crabs were about 40 percent more abundant. Sponge crabs appeared earlier this year.

Despite this relative increase in abundance the commercial catch, at least for the first two months of 1961, was 450 percent less than for the comparable period last year. This is the direct result of price. Last year the fisherman was getting 7 to 11 cents per pound for his catch; this year 4 to 5 cents.

**Pond Cultivation:** A commercial-scale shrimp pond located near Dale, S. C., was drained and harvested between October 8 and October 21, 1960. The shrimp harvest was not impressive, being only about 300 pounds, heads-on. The failure of the shrimp crop in the pond, however, can almost certainly be attributed to the tremendous numbers of predaceous fish present. It is estimated that at least 5,000 pounds of large

spot, winter trout, mullet, and other fish were present in the pond at the time of draining. Apparently, the screens on the pond flood gate had broken earlier in the year, allowing larger fish to enter and deplete the stock of small shrimp in the pond.



Of considerable interest was the occurrence of tarpon in the pond. Ten fish were taken in a cast net when the pond was being drained. These averaged 9 inches in length.

A one-tenth acre experimental shrimp pond at Bears Bluff Laboratories was drained on October 26, 1960. This pond was stocked with postlarval white shrimp in late July and August of 1960 and had been treated with tea seed cake on October 3, in an effort to kill any predatory fish which might be present. The success of this treatment was apparent immediately, as many small trout and other fish were observed to be dying soon after the poison was put in the pond. When the pond was harvested almost no fish, with the exception of several small mullet, were found. The shrimp harvest from this small pond was very encouraging as approximately 700 white shrimp from 2 to 6 inches were collected at the time of the draining.

On December 15, a one-acre experimental pond was drained in preparation for its use in shrimp cultivation research in 1961. Approximately 400 small (3-6 inch) winter trout and about 200 channel bass (3-5 inch) were collected alive. This pond had been harvested in September and was screened completely with quarter-inch wire mesh, so the young bass and trout probably entered through the screen as larvae or very young fish. These results lend an encouraging note to the pros-

pect of raising salt-water sport fish in ponds.

Experimental ponds at the Laboratories were made ready for postlarval shrimp stocking during the first quarter of 1961. Two large (one acre) ponds were drained, treated with a commercial fish poison to kill remaining fish, and screened with  $\frac{1}{4}$ -inch wire screening. These ponds were allowed to refill and were opened in February to begin natural stocking of postlarval shrimp.

A one-quarter acre pond which had been stocked with flounders in 1960 was drained on March 1, 1961. Only a few of the stocked flounders had survived, but these had grown considerably and were in good condition. When stocked, these fish were from 3 to 8 inches in total length; when harvested, from 11 to 14 inches. This indicates that there is some possibility of rearing flounders in ponds.

On March 28, 1961 a small one-tenth acre pond was drained. This pond had been opened in January 1961 to allow water to enter from the creek on each tide. A large plankton net was placed over the drainage trunk while the pond was draining in order to collect any organisms which had previously entered. Killifish, small spot, mysids, and hardback shrimp were abundant in the collection, but postlarval brown shrimp were few in number. This tends to support the findings of the plankton work, which indicates that postlarval brown shrimp have been scarce in inshore waters to date.

The one-tenth acre pond was then allowed to dry, closed off and refilled by means of a four-inch fish pump (described in Commercial Fisheries Review, vol. 17, no. 2, February 1955), acquired from the U. S. Fish & Wildlife Service. This pump will be used throughout the coming year in experiments on the possibilities of stocking shrimp ponds with postlarvae by means of pumping water into them from the creek near the Laboratory.

Experimental work with tea seed cake, with saponin as the active ingredient, both in aquaria and ponds at Bears Bluff has indicated that this material is an excellent specific poison, killing fish but leaving shrimp unharmed. The supply of tea seed cake given to the Laboratory by the U. S. State Department and by Dr. Yun-an Tang



has been exhausted. Current prices on saponin are such that it would cost \$150 per acre to treat shrimp ponds. Such costs would be prohibitive for commercial growers of shrimp.

Studies were made to determine the feasibility of using rotenone in place of tea seed cake to remove unwanted fish from shrimp ponds. Experiments in Laboratory aquaria indicate that rotenone powder has little, if any, effect on shrimp or shrimp larvae, although it is quite deadly to fish at concentrations of 1 to 3 parts per million. Further research is needed, however, before rotenone is used on a large scale.

**King Whiting:** Research on king whiting was continued throughout the last quarter of 1960. Data collected on these fish since 1953 have now been tabulated and are being used to supplement the present study. Approximately 1,500 specimens were scientifically processed during 1960 and much valuable information is coming to light regarding the biology of these valuable food and game fishes.

The present investigation indicates that king whiting are much more important off South Carolina both as sports and food fish than is generally supposed, and that these fishes have showed no major decline in numbers during recent years. Information being collected regarding spawning, distribution, and life history in general seems to show that there is no immediate threat of a decrease in numbers of king whiting in South Carolina waters.



## Standards

### VOLUNTARY QUALITY STANDARDS PROPOSED FOR FROZEN FRIED SCALLOPS:

Public meetings to discuss the recently-developed quality standards for frozen fried scallops were announced by the U. S. Bureau of Commercial Fisheries.

Developed by the Bureau at its technological laboratory in Gloucester, Mass., the standards are another important step in a continuing effort by Government and industry to make fishery products more acceptable to the consumer.



Preparing scallop meats for deep frying in the plant of a leading New Bedford firm.

Similar quality standards have been developed and are in use for fish sticks; fish blocks; salmon and halibut steaks; cod, haddock, and ocean perch fillets; raw breaded fish portions; and raw breaded and raw headless shrimp.

All interested parties were invited to attend public meetings held in April and May 1961, at Chicago, Ill., and New Bedford, Mass.



## United States

### FISHERY TRENDS FOR 1960 SHOW TUNA AND SHRIMP POPULARITY INCREASED:

Tuna, which six decades ago was a "throw-away" fish, and shrimp, a popular seafood, have an increasing appeal to the United States consumer.



In 1960 the per capita consumption of fishery products in the United States was 10.5 pounds. This approximates the long-time average. Of this total, 2.05 pounds were credited to canned tuna, 1.42 pounds to ocean perch and groundfish fillets (cod, haddock, hake, cusk, and pollock), and 1.19 pounds to shrimp.

Ocean perch and groundfish fillet consumption since 1949 has varied from 1.29 pounds to 1.56 pounds. The use of canned tuna, however, has increased steadily from 0.9 pound in 1949 to the present 2.05



pounds. Consumption of shrimp has increased from 0.71 pound to 1.19 pounds during the same period.

Decreases in the catch of salmon and sardines compared with earlier years is reflected in decreased consumption of those products in recent years.

The total domestic catch was placed at 4.93 billion pounds valued at \$347 million ex-vessel. The tuna catch was 296.9 million pounds with a value of \$37 million and the shrimp (heads-on) harvest was 249 million pounds worth \$66.9 million. The industrial fish--menhaden--accounted for nearly 2 billion pounds of the 1960 catch.

The value of the catch to the processor was \$599 million; to the wholesaler, \$827 million; and to the retailer, \$1,078 million. The retail value for the 1959 catch was \$1,075 million, despite the fact that the 1959 catch was somewhat higher than that of 1960.



## United States Fishing Fleet<sup>1/</sup> Additions

### MARCH 1961:

A total of 41 vessels of 5 net tons and over were issued first documents as fishing

Table 1 - U. S. Vessels Issued First Documents As Fishing Craft By Areas, March 1961

Area	March		Jan.-Mar.		Total
	1961	1960	1961	1960	1960
	(Number)				
New England . . . . .	2	1	9	3	34
Middle Atlantic . . . . .	1	1	1	5	13
Chesapeake . . . . .	8	-	12	9	76
South Atlantic . . . . .	8	4	11	14	45
Gulf . . . . .	6	6	24	13	85
Pacific . . . . .	14	10	23	19	138
Great Lakes . . . . .	2	2	3	3	17
Puerto Rico . . . . .	-	-	2	-	-
Total . . . . .	41	24	85	66	408

Note: Vessels assigned to the various areas on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft By Tonnage, March 1961

Net Tons	Number
5 to 9 . . . . .	20
10 to 19 . . . . .	13
20 to 29 . . . . .	1
30 to 39 . . . . .	1
40 to 49 . . . . .	4
90 to 99 . . . . .	1
130 to 139 . . . . .	1
Total . . . . .	41

craft during March 1961--an increase of 17 vessels as compared with March 1960. The Pacific area led with 14 vessels, followed by the Chesapeake and South Atlantic

with 8 vessels each. The Gulf, New England,

<sup>1/</sup>Includes both commercial and sport fishing craft.

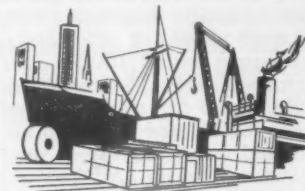
Great Lakes, and Middle Atlantic areas accounted for the remaining 11 vessels.

During the first three months of 1961, a total of 85 vessels were issued first documents as fishing craft--an increase of 19 vessels compared with the same period of 1960.



## U. S. Fish Meal and Solubles Production and Imports, January-February 1961

During the first two months of 1961, the United States production of fish meal amounted to 4,800 tons, compared with 4,900 tons for the same period in 1960. There was a drop of nearly 400 tons in tuna and mackerel meal, but menhaden and other fish meal were up slightly as compared with the same period the previous year.



Imports of fish meal totaled 23,900 tons for the 2-months period in 1961--7,200 tons more than in the same period of 1960. Im-

U. S. Supply of Fish Meal and Solubles, January-February 1960-61 and Total for 1960

Item	January-February		Total
	1961	1960	1960
	(Tons)		
<b>Fish Meal:</b>			
Domestic production:			
Menhaden . . . . .	531	440	218,423
Tuna and mackerel . . . . .	2,880	3,263	26,325
Herring, Alaska . . . . .	-	-	6,071
Other . . . . .	1,383	1,212	38,897
Total domestic production	1/4,794	1/4,915	289,716
Imports:			
Canada . . . . .	3,898	6,211	30,982
Peru . . . . .	17,334	6,092	68,156
Chile . . . . .	1,061	2,768	21,183
Angola . . . . .	-	-	888
Union of South Africa . . . . .	1,486	1,511	7,073
Other countries . . . . .	96	70	3,279
Total imports . . . . .	23,875	16,652	131,561
Available fish meal supply	28,669	21,567	421,277
<b>Fish Solubles (wet weight):</b>			
Domestic production <sup>2/</sup>	2,631	3,509	98,929
Imports:			
Canada . . . . .	194	186	869
Denmark . . . . .	-	1,858	1,858
Other countries . . . . .	180	45	447
Total imports . . . . .	374	2,089	3,174
Available fish solubles supply	3,005	5,598	102,103

<sup>1/</sup>Based on reports from firms which accounted for 92 percent of the 1960 total production.

<sup>2/</sup>Includes production of homogenized-condensed fish.

ports from Peru (17,300 tons) during that period comprised about 75 percent of the total, and were nearly 3 times greater than imports from that country in the 2-months period of 1960. Canada followed with the next largest amount (3,900 tons) but the quantity was down to less than one-half that of the comparable period in 1960. The tie-up of the British Columbia fleet (because of a disagreement on the ex-vessel price of herring) was responsible for the lower imports from Canada. The remaining 2,600 tons were from Chile, Union of South Africa, and a very small quantity from other countries.

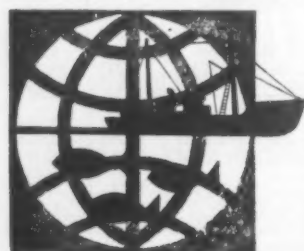
During the first two months of 1961, the domestic production of fish solubles amounted to 2,600 tons—a drop of 900 tons as compared with the same period in 1960. Imports of fish solubles in the 2 months period of 1961 totaled only 400 tons as compared with 2,100 tons for the comparable period in 1960. The very low prices which have prevailed for some time on fish solubles are responsible for the drop in domestic production and imports. Many industrial products produced in the United States and in foreign countries are adding the solubles to the meal to increase its protein content.



## U. S. Foreign Trade

### EDIBLE FISHERY PRODUCTS, FEBRUARY 1961:

Imports of edible fresh, frozen and processed fish and shellfish into the United States



during February 1961 decreased by 2.8 percent in quantity and 2.2 percent in value as compared with January 1961. The decrease was due primarily to lower imports of groundfish fillets (down 4.8 million pounds) and frozen shrimp (down 3.4 million pounds). The decrease was partly offset by a 4.7-million-pound increase in the imports of frozen tuna other than albacore and frozen fillets other than groundfish fillets (up 2.4 million pounds).

Compared with February 1960, the imports in February this year were up by 31.7

percent in quantity and 30.7 percent in value due to higher imports of frozen albacore and other tuna (up 9.7 million pounds), groundfish fillets (up 3.5 million pounds), and canned tuna in brine (up 2.1 million pounds). Compensating, in part, for the increases was a drop of about 4.0 million pounds in the imports of fillets other than groundfish and canned salmon (down 2.6 million pounds).

U. S. Imports and Exports of Edible Fishery Products, February 1961 with Comparisons						
Item	Quantity		Value			
	February	Year	February	Year	February	Year
	1961	1960	1961	1960	1960	1960
. (Millions of Lbs.) . . (Millions of \$) . .						
<b>Imports:</b>						
Fish & shellfish:						
Fresh, frozen, & processed 1/ . .	82.8	62.8	1,011.2	26.8	20.5	304.8
<b>Exports:</b>						
Fish & shellfish:						
Processed only 1/ (excluding fresh & frozen) . .	4.4	5.3	48.7	1.9	1.3	19.2

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in February 1961 rose 75.5 percent in quantity and 72.7 percent in value as compared with January 1961. Compared with the same month in 1960, the exports this February were lower by 16.2 percent in quantity, but were up 46.2 percent in value. The lower quantity of exports in February this year as compared with the same month in 1960 was due to lower exports of California sardines and squid. The higher value of the exports in February 1961 was due to increased exports of relatively high-priced canned salmon and shrimp, and frozen shrimp.

\*\*\*\*\*

### IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

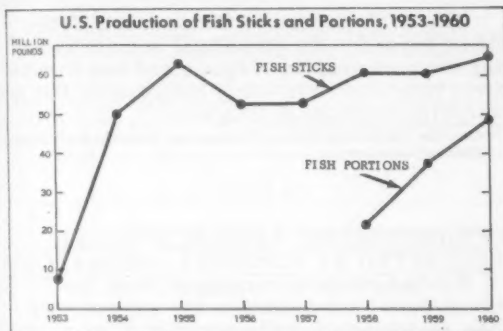
The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1961 at the 12½-percent rate of duty is 57,114,714 pounds. Any imports in excess of the quota are dutiable at 25 percent ad valorem.

Imports from January 1-April 1, 1961, amounted to 11,822,619 pounds, according to data compiled by the Bureau of Customs. Imports in 1960 for the period January 1-April 2 amounted to 8,581,279 pounds.



## U. S. Production of Fish Sticks and Portions, January-March 1961

United States production of fish sticks during the first quarter of 1961 amounted to 20.3 million pounds and the production of fish portions totaled 14.9 million pounds. This was a gain of 427,000 pounds (2 percent) in fish sticks and 3.3 million pounds (28 percent) in fish portions as compared with the same quarter of the previous year.



Cooked fish sticks (19.1 million pounds) comprised 94 percent of the total fish stick production, while the remaining 1.2 million pounds (6 percent) consisted of raw fish sticks. A total of 14.4 million pounds of breaded fish portions (of which 11.7 million pounds were raw) and 0.5 million pounds of unbreaded portions were processed during the first quarter of 1961.

Table 1 - U. S. Production of Fish Sticks by Months and Type, January-March 1961<sup>1/</sup>

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
January . . . . .	5,730	336	6,066
February . . . . .	6,718	341	7,059
March . . . . .	6,671	507	7,178
Total 1st quarter 1961 . . . . .	19,119	1,184	20,303
Total 1st quarter 1960 . . . . .	18,616	1,260	19,876

<sup>1/</sup>Preliminary data.

Table 2 - U. S. Production of Fish Sticks, 1957-1961

Month	1961 <sup>1/</sup>	1960 <sup>2/</sup>	1959	1958	1957
	(1,000 Lbs.)				
January . . . . .	6,066	5,504	6,277	5,471	4,261
February . . . . .	6,535	6,352	5,925	5,246	4,246
March . . . . .	7,059	7,837	5,604	5,526	5,147
April . . . . .	-	4,864	4,717	4,855	4,492
May . . . . .	-	3,700	4,407	4,229	3,380
June . . . . .	-	4,362	4,583	4,702	3,522
July . . . . .	-	3,684	3,790	4,574	3,821
August . . . . .	-	5,006	3,879	4,358	4,643
September . . . . .	-	5,417	5,353	5,328	4,861
October . . . . .	-	6,554	5,842	5,485	5,162
November . . . . .	-	6,274	4,831	5,091	4,579
December . . . . .	-	5,322	4,743	5,467	4,014
Total . . . . .	-	65,059	60,378	61,011	53,128

<sup>1/</sup>Preliminary data.

<sup>2/</sup>Revised.

Table 3 - U. S. Production of Fish Sticks by Areas, January-March 1960 and 1961

Area	1961 <sup>1/</sup>		1960 <sup>2/</sup>	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . . . . .	22	16,526	24	16,410
Inland and Gulf States . . . . .	5	1,974	5	1,532
Pacific Coast States . . . . .	8	1,803	7	1,934
Total . . . . .	35	20,303	36	19,876

<sup>1/</sup>Preliminary data.

<sup>2/</sup>Revised.

The Atlantic Coast was the principal area in the production of both fish sticks and portions with 16.5 and 9.3 million pounds, respectively. The remaining 3.8 million pounds of fish sticks and 5.6 million pounds of fish portions were represented by the inland, Gulf, and Pacific Coast States.

Table 4 - U. S. Production of Fish Portions, by Months, January-March 1961

Month	Breaded			Un-breaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
January . . . . .	677	3,449	4,126	133	4,259
February . . . . .	739	3,924	4,663	202	4,865
March . . . . .	1,300	4,339	5,639	166	5,805
1st Quarter . . . . .					
Total 1961 . . . . .	2,716	11,712	14,428	501	14,929
1st Quarter . . . . .					
Total 1960 . . . . .	1,879	9,360	11,239	393	11,632

Table 5 - U. S. Production of Fish Portions by Areas, January-March 1961 and 1960

Area	1961 <sup>1/</sup>		1960 <sup>2/</sup>	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . . . . .	24	9,324	24	6,832
Inland and Gulf States . . . . .	7	5,183	5	4,521
Pacific Coast States . . . . .	6	422	5	279
Total . . . . .	37	14,929	34	11,632

<sup>1/</sup>Preliminary data.

<sup>2/</sup>Revised.

Table 6 - U. S. Production of Fish Portions, 1958-1961

Month	1961 <sup>1/</sup>	1960 <sup>2/</sup>	1959	1958
January . . . . .	4,259	3,604	2,692	1,973
February . . . . .	4,865	3,434	3,025	1,254
March . . . . .	5,805	4,594	3,225	1,471
April . . . . .	-	3,399	2,634	2,269
May . . . . .	-	3,171	2,684	1,478
June . . . . .	-	3,922	3,247	1,504
July . . . . .	-	4,020	2,227	2,161
August . . . . .	-	3,496	2,796	1,516
September . . . . .	-	4,543	3,558	1,566
October . . . . .	-	5,148	4,314	2,560
November . . . . .	-	4,462	3,483	1,979
December . . . . .	-	4,327	3,262	2,060
Total . . . . .	-	48,300	37,147	21,790

<sup>1/</sup>Preliminary data.

<sup>2/</sup>Revised.



## Virginia

### FISHERIES LANDINGS IN 1960 TOP 30-YEAR AVERAGE:

The 1960 landings of fish and shellfish in Virginia amounted to 353.8 million pounds, valued at \$19.4 million. The Institute of Marine Science at Gloucester Point, Va., reported that despite adversities, landings were well above average. Although the 1960 harvest fell short of the 1959 yield, it was over 60 million pounds more than the average landings for the past 30 years. The 1960 crop topped the 30-year average value by nearly \$7 million.

The lower 1960 oyster production was predicted by the Institute's scientists. The drop from 21 to 15 million pounds, however, was less than was believed would occur. Croaker landings declined to 2.5 million pounds in 1960--over 5 million pounds less than the 1959 catch of 7.5 million pounds. Institute scientists held little hope for improvement of this fishery for at least two summers. Cold weather, occurring at the time when young croakers were in fresh water, was believed to have killed off great numbers during recent winters.

Although there was a decline in the menhaden catch during the summer of 1960, it was not due to the scarcity of fish. A superabundance of menhaden in 1959, when a near record of over 412 million



HOGRAIDEN VESSEL  
APPROACHING REDUCTION PLANT.

pounds were landed, plus increasing competition from foreign sources had depressed the fish meal market, and the amount landed was voluntarily restricted by the processors.

Scup and sea bass, the mainstay of the winter trawl fishery, were taken in larger numbers during 1960, and grey sea trout were somewhat more plentiful than in 1959. Over 0.5 million pounds of swellfish or puffers were landed in 1960--an increase of 200,000 pounds from the previous year. These fish appear as "sea squab" on the market and the menus of better restaurants, and are becoming more popular.

Blue crabs were in short supply during the early season of 1960, but were very plentiful in August. The increased blue crab

harvest had been predicted by the Institute at least six months before it occurred, and also assured crab fishermen that additional regulation of this fishery would not be necessary in order to improve the yield. So many crabs were available to the winter dredge fishery that the industry requested the Virginia Commission of Fisheries to limit the 1960 season catch to 20 barrels per day. A good supply of crabs for the 1961 summer pot and scrape fishery is again predicted.

The U. S. Bureau of Commercial Fisheries expanded its statistical services during the past year in Virginia and has for the first time issued monthly bulletins of fish and shellfish landings in Virginia.

Note: The Institute of Marine Science was formerly the Virginia Fisheries Laboratory.

\* \* \* \* \*

### OCEANOGRAPHIC RESEARCH VESSEL REQUESTED BY FISHERIES LABORATORY:

Funds have been requested from the National Science Foundation for the construction, maintenance, and operation of an oceanographic research vessel for The Institute of Marine Science at Gloucester Point. The Institute's Director announced on April 19, 1961, that the proposed ship would be about 200 feet long, and would accommodate 46 scientists and crewmen up to 120 days at sea. "Our vessel should be a general purpose ship capable of making hydrographic casts under way and at rest; of taking cores and bottom grabs at depths of at least 3,000 fathoms, and of trawling and dragging to depths of about 1,500 fathoms, the Institute's Director declared.

The proposed new ship would contribute to the development of the research capabilities of Virginia's marine laboratory and also aid in the entire United States Oceanographic Research effort. It would provide for both research and for the training of future oceanographers. The vessel, if granted would be used to conduct biological and physical research on the continental shelf off Virginia and beyond in the North Atlantic Ocean, and to train marine scientists and students. It would be constructed and equipped to take care of all conceivable biological work as well as for collecting hydrographic data from the ocean depths, and serve in the testing of new gear and instruments.



The estimated cost of the proposed vessel is about \$4.5 million plus an additional \$500,000 for instruments. The Institute's Director contemplates that the ship should be in service by the summer of 1964, if approved by the National Science Foundation.



### Wholesale Prices, April 1961

The April 1961 wholesale price index for edible fishery products (fresh, frozen, and canned) at 125.4 percent of the 1947-49 average declined 4.9 percent from the preceding month, but was up 1.7 percent from April 1960. The drop in the index from mid-March to mid-April this year was due mainly to seasonally-lower prices for fresh drawn haddock, sharply lower prices for the fresh-water varieties, and slightly lower prices for fresh shrimp, fresh or frozen dressed salmon, and frozen haddock and ocean perch fillets.



New York City Fulton Fish Market. General view of street side of the older of two sheds after selling activity is about over.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, April 1961 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1</sup> / (\$)		Indexes (1947-49=100)			
			Apr. 1961	Mar. 1961	Apr. 1961	Mar. 1961	Feb. 1961	Apr. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					125.4	131.9	133.0	123.3
<u>Fresh &amp; Frozen Fishery Products:</u> . . . . .					136.1	146.8	148.9	136.7
<u>Drawn, Dressed, or Whole Finfish:</u> . . . . .					139.0	161.3	160.2	144.3
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.06	.12	55.8	122.4	100.5	60.8
Halibut, West., 20/80 lbs., drsd., fresh or froz. . . . .	New York	lb.	.33	.33	103.1	101.1	99.0	92.8
Salmon, king, lge. & med., drsd., fresh or froz. . . . .	New York	lb.	.85	.88	191.0	196.6	205.0	179.2
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.46	.70	114.0	173.0	186.0	241.7
Whitefish, L. Erie pound or gill net, rnd., fresh . . . . .	New York	lb.	.50	.70	101.2	141.6	126.4	212.5
Yellow pike, L. Michigan & Huron, rnd., fresh . . . . .	New York	lb.	.51	.70	119.6	164.2	161.8	234.5
<u>Processed, Fresh (Fish &amp; Shellfish):</u> . . . . .					143.4	150.1	155.1	137.1
Fillers, haddock, sml., skins on, 20-lb. tins . . . . .	Boston	lb.	.27	.42	90.2	141.2	114.0	93.6
Shrimp, lge. (26-30 count), headless, fresh. . . . .	New York	lb.	.79	.85	124.0	134.3	138.2	123.2
Oysters, shucked, standards . . . . .	Norfolk	gal.	7.25	7.00	179.4	173.2	185.6	164.0
<u>Processed, Frozen (Fish &amp; Shellfish):</u> . . . . .					113.7	115.1	117.4	116.2
Fillers: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.39	.39	100.8	100.8	102.1	92.5
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.32	.34	100.5	105.2	113.0	84.8
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.29	.31	116.8	122.8	122.8	116.8
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.70	.70	107.2	107.2	108.0	118.0
<u>Canned Fishery Products:</u> . . . . .					111.2	111.2	110.9	104.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . . . .	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	129.8
Tuna, lt. meat, chunk, No. 1 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	11.00	11.00	79.3	79.3	79.3	80.0
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	7.75	7.75	91.0	91.0	91.0	93.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	8.75	8.75	93.1	93.1	90.5	93.1

<sup>1</sup>/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.



From April last year to this April, higher prices for frozen dressed halibut and salmon, haddock filets, canned salmon, fresh shrimp, and shucked oysters more than offset lower prices for the fresh fish items and frozen shrimp.

The fresh and frozen drawn, dressed, or whole finfish subgroup index for this April dropped 13.8 percent from the preceding month. The more significant price declines were in fresh drawn haddock as a result of seasonally heavier landings at Boston and in fresh-water fish because of new seasonal supplies. Good demand and low stocks in storage were responsible for an increase in prices for frozen halibut—the only item in the subgroup that increased. When compared with April last year, the subgroup index this April dropped 3.7 percent. Higher prices for frozen dressed halibut (up 11.1 percent) and salmon (up 6.6 percent) failed to offset sharp declines (averaging about 50 percent) for the three fresh-water items and an 8.2-percent drop in prices for fresh drawn haddock.

From March to April this year the fresh processed fish and shellfish subgroup index declined 4.5 percent due to lower prices for fresh small haddock filets (down 36.1 percent) and fresh shrimp at New York City (down 7.7 percent). The declines were partly offset by higher prices for shucked oysters at Norfolk, Va. As compared with April last year, subgroup prices this April were higher by 4.6 percent. A drop

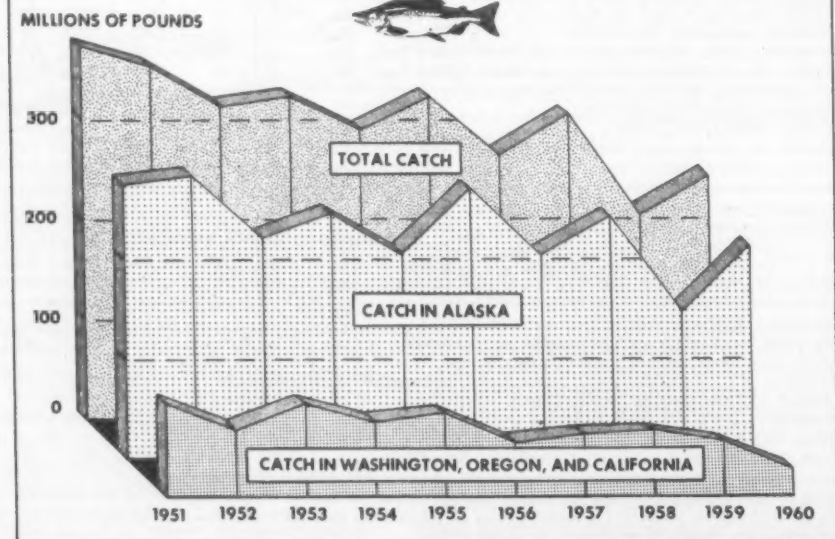
of 3.6 percent in fresh haddock fillet price at Boston was more than balanced out by an increase of 9.4 percent in shucked oyster prices and a slight increase (0.6 percent) in the fresh shrimp price.

Wholesale prices this April for frozen processed fish and shellfish were down 1.2 percent from the preceding month because of lower prices for frozen haddock filets (down 4.5 percent) and frozen ocean perch filelets (down 4.9 percent). Prices for frozen flounder filelets at Boston and frozen brown shrimp at Chicago were unchanged from March to April this year. The subgroup index declined 2.2 percent from April 1960 to this April. While prices were up for frozen haddock filelets by 18.5 percent and for flounder filelets by 1.3 percent, frozen shrimp prices at Chicago dropped 9.2 percent and prices for frozen ocean perch filelets were unchanged.

Wholesale prices for canned fishery products from March to April this year were unchanged, but rose 6.1 percent from the same month a year ago to April of this year. The increase from a year ago was entirely due to a 14.3-percent increase in canned pink salmon prices, which was offset somewhat by lower prices for canned California sardines (down 3.1 percent) and canned tuna (down 0.9 percent). Maine canned sardine prices this April were the same as a year earlier.



### PACIFIC SALMON CATCH, 1951 - 1960





# FOREIGN

## International

### FISHING LIMITS

#### BRITISH-ICELANDIC DISPUTE SETTLED:

The 2½-year dispute between Iceland and Britain over fishing limits off the Icelandic Coast was settled with an exchange of notes between the two Governments on March 11, 1961.

The note from Britain to Iceland reads in part as follows:

"I have the honour to confirm that in view of the exceptional dependence of the Icelandic nation upon coastal fisheries for their livelihood and economic development, and without prejudice to the rights of the United Kingdom under international Law towards a third party, the contents of Your Excellency's Note are acceptable to the United Kingdom and the settlement of the dispute has been accomplished on the terms stated therein. I also confirm that the United Kingdom Government agrees that the settlement becomes effective forthwith and that the Notes exchanged today shall be registered with the Secretary-General of the United Nations in accordance with Article 102 of the United Nations Charter."

On March 11, the Government of Iceland issued necessary regulations to apply to British trawling off Iceland and wiped clean the slate of any remaining fines against British trawlers which had illegally entered the fishing limits zone. The agreement with the United Kingdom provided that the base lines of the fisheries boundary would be revised outward in certain areas to protect an added 5,065 square miles. (United States Embassy, Reykjavik, March 13 & 22, 1961.)

### FOOD AND AGRICULTURE ORGANIZATION

#### FISHERY OFFICER TO HEAD ECUADORAN FISHERY INSTITUTE:

A former Food and Agriculture Organization (FAO) fishery officer in Libya, Tunisia,

and Haiti was scheduled to arrive in Ecuador the latter part of April for a four-year assignment as Director of the National Fisheries Institute at Guayaquil, Ecuador. The Ecuadoran National Fishery Institute is the second major United Nations Special Fund fisheries project, with FAO as executing agency, to be established in Latin America. The project calls for a Government contribution of \$663,040 over a four-year period, and a U. N. Special Fund contribution of \$633,800.

The FAO fishery officer has been in Haiti since July 1960. Prior to that, he was fishery officer and FAO representative in Tunisia for 3½ years. While in Tunisia, he was active in finding and charting new fishing grounds, improving the sardine fisheries, and in extending Tunisian trawling farther offshore. Together with an FAO master fisherman, he introduced the use of underwater lamps into Tunisian sardine fishing. The FAO specialist, who holds a master's certificate in the French Merchant Marine, joined the French Fisheries Service in 1945 as fisheries expert and administrator. He was previously fisheries adviser to the Viet Nam Government and fisheries expert with the Supreme Commander for the Allied Powers (SCAP). His first assignment for FAO was in 1956 in Libya.

The purpose of the Ecuadoran Institute is to help the Government foster the country's economic development by a substantial expansion of fishing and ancillary activities. Pier facilities, maintenance for the Institute's two research vessels, and personnel are to be provided by the Ecuadoran Navy. The Navy also will provide hydrographic and meteorological information on areas not studied by the Institute's vessels and will provide a ship for several months of whale-marking each year in the seas off Ecuador.

The Director of FAO's Fisheries Division said the institute is intended to be permanent, and the foreign staff will gradually be replaced by a trained national staff. It is designed to improve knowledge of fish availability and methods of catching, handling, proc-

## International (Contd.):

cessing, and marketing fish. In Ecuador, this should mean better management and exploitation of fish stocks, particularly bonito, anchoveta, and shrimp.

\* \* \* \* \*

#### REGIONAL FISHERIES BODY FOR WEST AFRICA UNDER CONSIDERATION:

A regional fisheries body to serve member countries of the Food and Agriculture Organization (FAO) in West Africa as other FAO fisheries bodies do in the Mediterranean and in the Indo-Pacific regions, was the subject of invitations issued on March 29, 1961, by the Director-General of FAO.

The invitations, sent to all FAO member and associate governments in an area bounded by the Straits of Gibraltar and the Cape of Good Hope, including the regions which drain into the Atlantic Ocean and Lake Chad, convened a meeting May 15-20, 1961, in the Republic of Senegal to explore the possibility of establishing a fisheries consultative body in the Western African region.



The Director-General was requested at the 10th session of the FAO Conference in November 1959 to explore the establishment of such a commission. The proposal was endorsed by the United Nations Economic Commission for Africa (UNECA) in February 1960 and by the first FAO Regional Conference for Africa at Lagos held in November 1960.

The main purpose of the meeting was to seek advice from delegates as to the scope of activity and terms of reference for such a consultative body and the area which it will serve. It also considered the Commission's relationship with other international bodies concerned with fisheries in the West African area.

The delegates were asked to give a brief statement concerning the general problems facing fishery development in their countries, where the solutions might be facilitated by international action by a fisheries consultative body under the aegis of FAO.

Invitations to attend the meeting as observers were sent to UNECA, the Commission for Technical Cooperation in Africa South of the Sahara (CCTA), the International Council for the Exploration of the Sea (ICES), and the Permanent Commission of the International Fisheries Convention - 1946.

In addition to the Fisheries Division Director, FAO was represented at the meeting by the FAO Regional Representative for Africa and the Regional Fisheries Officer for Africa, both stationed at Accra, Ghana.

#### FOURTH CONVENTION ON ECONOMIC RELATIONS WITH THE AFRICAN CONTINENT

#### MEETING HELD IN NAPLES, ITALY, STRESSES FISHERIES:

From April 4 to 6, 1961, representatives of the African nations of Cameroun, Central Africa, the Congo (Brazzaville), Gabon, Niger, Senegal, and Chad visited Naples, where they attended a conference on maritime traffic, shipbuilding, and fishing, and toured industries generally related to the subjects of the conference. The Africans came to Italy as delegates to the "Fourth Convention on Economic Relations with the African Continent" sponsored by the Italian Institute for Africa. The Naples Port Administration availed itself of their presence in the country to invite them to Naples for the program that took place there.

The purpose of the conference was not to accomplish any specific concrete result, but simply to plant the seeds of further Italian-African cooperation in the fields covered. The African representatives are reported to have played more the part of observers than of active participants in the proceedings. To the extent that they did express their views, the item on the agenda of most interest to them was fishing.

The papers presented at the conference were generally brief. They did not purport to be extensive expositions of the subjects on the program. However, at least two points of interest were made. The first of these related to the type of shipping that would be employed in the African-Italian trade in the foreseeable future.

The other principal theme discussed was the possibility for greatly increased technical and economic cooperation between Italy and the African states in the development of Afri-

## International (Contd.):

can fisheries. Given the poverty of the Mediterranean as a fishing sea, one speaker noted, the Italian Government is moving toward a policy designed to foster the operation of Italian fishing fleets in the Atlantic and to put the fishing industry on a more industrial basis. In line with this policy, the speaker said, mutually profitable arrangements could be made between Italy and the African states. Italy could supply the modern motor vessels needed and the key members of the crew. The Africans who completed the crew would, in time, become qualified to take on the more specialized jobs. Agreements on fishing could also provide for the development of freezing plants in African states and for the exportation of the frozen fish to Italy. Another type of industrial plant suggested as an example was for processing fish waste to make fertilizer.

The conference adopted two resolutions. They were:

(1) That Italo-African meetings be more frequent and more regular, and that the Mostra d'Oltremare (Naples fair grounds) become the permanent site for such meetings.

(2) That legislative and administrative policies designed to strengthen the ties between Italy and the African countries in the fields of maritime transportation, shipbuilding, and fishing be developed. (United States Consulate in Naples, April 12, 1961.)

## SEALING

HUNTING BY CANADIANS, NORWEGIANS, AND RUSSIANS IN NORTHEAST ATLANTIC:

At one time, one-third the male population of Newfoundland was engaged in the seal industry--400 sailing ships and 15,000 men hunted seals. Wooden steam vessels, "Dundee whalers," and later steel ships hunted together. The seal industry did much for the economy of Newfoundland when it was active.

However seal hunting later declined, and by 1960 the Newfoundland seal fishery accounted for 22,388 seals valued at C\$74,955 with only three vessels.

In March 1961 it was reported that Newfoundland's seal fleet was not having a good season. Bad weather and ice conditions combined kept them out of reach of sizable

herds, and reports indicated that some may have "lost their spring." At that time, a Russian vessel appeared to be doing better than the Newfoundland craft. It was a large ship, and reportedly capable of maneuvering through ice more satisfactorily than Canadian vessels.



Seal hunting.

Russia also is reportedly having remarkable success cod fishing off the coast of Newfoundland.

Russia has previously hunted seals in the northwest Atlantic, but never before near Newfoundland. In March 1961, when the large Russian sealing vessel was spotted off the coast of Newfoundland, it killed seals efficiently aided by two helicopters. This aroused considerable concern in St. John's. One Newfoundland operator with two ships engaged in the seal fishery this year complained that the Russian helicopters scattered a herd of 3,000 seals they were prepared to kill.

The success of the Russian vessel, together with the success of Norwegian hunters (in March 1961 Norwegians caught 50,000 seals near the Grey Islands) has given rise to the question of how Newfoundland sealers can be protected.

Canada, for the first time, is now licensing vessels for seal hunting and has reached an agreement with Norway and Denmark relating to killing seals. A Canadian official has stated that the only solution is an international commission to control seal hunting. (United States Consulate, St. John's, March 23, 1961.)

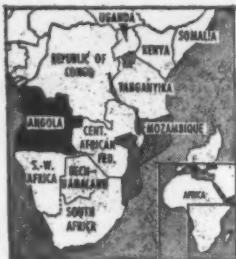




## Angola

### FISHING INDUSTRY DEPRESSED:

The fishing industry is one of Angola's most important economic activities and has earned substantial sums of foreign exchange. In the past decade, fishery products have been Angola's third largest export, following coffee and diamonds. Following very profitable years in the early and mid-1950's, the industry is now experiencing a depression with its very existence in question. This has been caused by (1) the shortage of fish in the traditional fishing grounds; (2) uneconomic manufacturing plants (though a few fish meal factories are very modern) and methods of production; and (3) low fish meal prices on the world market. The depression has had grave influences on the economies of the Mocamedes and Benguela areas, the two major fishing centers.



Government assistance to the industry has been slow, but effective measures may be in the offing. Some Government loans were made to firms. In 1959, subsidies were being granted for fish meal and oil exports to make up the difference between the market price and the cost of production. The Fund to Aid the Fishing Industry has been created to give financial assistance. To oversee both the short-run assistance to the industry and the long-run reorganization, the Institute of Fishing Industries of Angola has been formed. Technical studies are being made of the life cycles of fish so as to aid fishermen in their search for fish.

It is expected that the industry will be reorganized into a small number of large co-operatives which will concentrate on producing dried fish, fish fillets, and canned and frozen fish, with fish meal and oil assuming secondary roles. Except for dried fish, the concentration of effort heretofore has been on fishery byproducts (fish meal and oil). Along marketing lines, the Institute is to search out foreign markets, and it is joining with fish meal associations of other countries to try to control market prices. All this activity is just beginning. The outlook is still uncertain because of the gravity of the crisis in the Angolan fishing

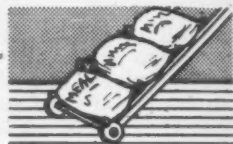
industry, uncertainty as to what measures will be taken, and the degree of influence to be exercised by entrenched fishing interests and the Institute. (United States Embassy, Luanda, March 30, 1961.)



## Belgium

### DUTY IMPOSED ON FISH MEAL IMPORTS:

On March 9, 1961, the Belgian Ministries of Agriculture and Economic Affairs issued a decree levying the following special duties, effective March 18, 1961, on the importation of fish meal and feedstuffs containing fish meal:



(1) Fish meal and powder, Belgian francs 2.00 per kilo (US\$36.29 a short ton); (2) Feedstuffs containing fish meal or powder, (a) of which the gross protein content amounts to 15 percent or less, Belgian francs 0.20 per kilo (\$3.63 a short ton); (b) of which the gross protein content amounts to more than 15 percent but less than 25 percent, Belgian francs 1.50 (3 U. S. cents) per protein unit and per 100 kilos; and (c) of which the gross protein content amounts to more than 25 percent, Belgian francs 2.00 per kilo (\$36.29 a short ton).

In addition to these import duties, there is also a "taxe de transmission" (sales tax) of 8 percent on fish meal, and 5 percent on feedstuffs containing fish meal.

The decree was issued as a result of negotiations between the Belgian Government and the association of fish-meal manufacturers, which had requested that measures be taken to protect the Belgian fish-meal industry against the alleged dumping practices of the Peruvian fish-meal industry. Imports of Peruvian fish meal, which account for most of Belgium's imports of the product, have shown a tremendous increase during the last few years, rising from about 19,000 metric tons in the first 11 months of 1959 to 41,277 tons in the corresponding period of 1960.

It is expected that Belgian imports of fish meal will decline somewhat because of the import duty which may also result in an expansion of the small local fish-meal industry which now has an annual production of between



## Belgium (Contd.):

6,000 and 10,000 metric tons. (United States Consulate, Antwerp, March 21, 1961.)

Note: Belgian francs converted at rate of BF 1 equals 2 U. S. cents.

\*\*\*\*\*

FISH-MEAL PRICES, APRIL 1961:

Belgium fish-meal prices early in April 1961 were higher than a month earlier for imported meal and unchanged for domestic meal. Imported Meal: 65 percent protein, US\$94.25 per metric ton or about \$85.50 a short ton, c. & f. Antwerp (80-90 percent digestible). Domestic Whole Meal (fish solubles added): 62 percent protein, \$99.20 a metric ton or about \$90.00 a short ton f.o.b. plant (93-94 percent digestible). Domestic Regular Meal: 50-55 percent protein, \$69.50-76.45 a metric ton or about \$63.05-69.36 a short ton f.o.b. plant (about 90 percent digestible). A special duty is now in effect on imported fish meal and it is probable that prices for domestic fish meal will increase in the future, the United States Consulate in Antwerp reported on April 5, 1961.



## Canada

NEW CANNED LOBSTER REGULATIONS REQUIRE CERTAIN DATA ON CANS:

Canada issued the following amendments to the Canned Fish and Shellfish and Cannery Inspection Regulations on February 22, 1961. The portion referring to the daily coding of the cans to indicate the day, month, and year of canning will not be implemented until the 1962 season.

1. Section 9A of the Canned Fish and Shellfish and Cannery Inspection Regulations is revoked and the following substituted therefor:

"9A. (1) Every can of lobster, tomalley or lobster paste packed in a cannery for which a permit has been issued shall be embossed on one end with the letter 'L' and with code markings that identify the cannery and indicate the day, month, and year of canning.

"(2) A copy of the key to every code used pursuant to subsection (1) shall be sent to the Minister at the beginning of canning operations each year.

"(3) Subject to subsection (5), every can of tomalley or lobster paste packed in a cannery for which a permit has been issued shall be embossed on one end with the letter 'T.'

"(4) No person shall buy, sell, ship, export or have in possession any can of lobster, tomalley or lobster paste that is not embossed as required by this section and every can of lobster, tomalley or lobster paste that is not so embossed may be seized and confiscated by an inspecting officer.

"(5) Lobster paste that is packed in the three-ounce can of the size designated (211 x 108) need not be embossed with the letter 'T.'"

\*\*\*\*\*

LAKE ERIE GILL NET MESH SIZE RESTRICTIONS REMOVED:

All restrictions governing the mesh-size of gill nets in the Canadian waters of Lake Erie have been removed, as an experimental measure for 1961. Fishermen in their daily regular reports are required to indicate the size of mesh that was used. Sale of fish under legal size will not be permitted, however. (Bulletin, March 27, 1961.)

\*\*\*\*\*

LAW DEFINING"FISHING VESSEL" REVISED:

On March 14, 1961, the Canadian House of Commons adopted a bill amending the Coastal Fisheries Protection Act so as to redefine what constitutes a Canadian fishing vessel. The new definition provides:

"1. Paragraph (a) of section 2 of the Coastal Fisheries Protection Act is repealed and the following substituted therefor:

"(a) 'Canadian fishing vessel' means a fishing vessel

(i) that is registered or licensed in Canada under the Canada Shipping Act and is owned by one or more persons each of whom is a Canadian citizen, a person resident and domiciled in Canada or a corporation incorporated under the laws of Canada or of a province, having its principal place of business in Canada, or

(ii) that is not required by the Canada Shipping Act to be registered or licensed in Canada and is not

## Canada (Contd.):

registered or licensed elsewhere but is owned as described in subparagraph (i);"

The previous definition read as follows:

"(a) 'Canadian fishing vessel' means a fishing vessel that is

- ( i) registered in Canada,
- ( ii) owned by one person domiciled and resident in Canada,
- (iii) owned by two or more persons, all of whom are domiciled and resident in Canada, or
- (iv) owned by a body corporate incorporated under the laws of Canada or the laws of a province and having its principal place of business in Canada;"

Senate approval was expected shortly.

In the debate prior to adoption of the legislation by the House of Commons, the Minister of Fisheries stated that the "main purpose of the act is to protect fisheries in Canadian territorial waters against encroachment by foreign fishing vessels and to regulate the privileges accorded to foreign fishing vessels in our ports." He stated further that "subject to any treaty rights, the act prohibits fishing operations by foreign fishing vessels in our waters."

Several members criticized the legislation for not dealing with the situation which permits foreign vessels to fish up to 3 miles of the Canadian coast line while Canadian vessels over certain size are not permitted closer than 12 miles to the shore line. In response to the criticism the Minister stated that he was hopeful that before the present session of Parliament adjourns, an amendment to the Fisheries Act will be introduced by the Government "which will bring a greater element of justice to the situation in which a number of Canadian trawlers find themselves as compared with foreign trawlers and yet at the same time protect the rights and interests of inshore fishermen in smaller boats."

On the general question of territorial waters the Minister stated:

"With regard to the width of our territorial waters, may I say that this again is an entirely different matter as is the baseline from which the width of territorial waters are to be measured. At the conference held under the auspices of the United Nations in Geneva last year there was the required two-thirds approval of several matters, one of which was the method of measuring territorial waters. When these 22 countries, I believe it is, ratify that agreement, this method will come into effect. The matter of the actual width of territorial waters or an exclusive fishing zone is a matter for further international agreement. I still have not given up hope that some international agreement may be reached. As to the need for further amending of this act if agreement is reached, that will depend on the type of agreement." (United States Embassy in Ottawa, March 29, 1961.)

\* \* \* \* \*

#### MARKET FOR BRITISH COLUMBIA FISH MEAL IMPROVES AS FISHING SEASON ENDS:

The British Columbia (Canada) herring fishing season closed early in March 1961 with the export price of fish meal between C\$1.55 and C\$1.60 per unit of protein f.o.b. Vancouver (C\$100.50-112.00 a short ton, 70 percent protein).

The increase in price is attributed to a higher price for soybeans in the United States, as well as a firmer market for Peruvian fish meal.

It is estimated that about 5,000 short tons of fish meal remained unsold in March. However, fishery sources believe that this inventory will be disposed of within the next few months.

It is generally understood that the fishing companies may at least break even in their fish meal production and sales. There is some reason to believe that the herring fishery may be resumed in June if the salmon run proves to be light.

The 1960/61 season herring landings were 171,941 short tons. This is down slightly from the previous year because of the late start of the fishery caused by the failure of the reduction plants and the fishermen to agree on a price for the fish. (United States Consulate, Vancouver, March 29, 1961.)

\* \* \* \* \*

## Canada (Contd.):

MARKET PROSPECTS FOR  
CANNED SALMON:

A review of the current and future market for British Columbia's canned salmon pack was published in the March 1961 Facts on Fish, issued by the Fisheries Association of B. C. in Vancouver.



(1) The record-high prices for canned salmon, which were a direct result of the high costs and small production in 1960, have slowed consumption in the Canadian market as well as in export markets. The small pack of 1960 plus the carryover from 1959, has proved sufficient to supply the reduced demand which accompanied the higher prices.

(2) A feature of the current market is the greatly reduced volume of sales to the United Kingdom. At the end of February in the current market year, these sales were down 60 percent from last year at the same date. This reflects, of course, our reduced supply situation in British Columbia, but it also reflects a greatly reduced demand in the United Kingdom. British distributive outlets are now very heavily stocked with canned salmon, particularly Japanese, and the rate of consumption has declined.

(3) From last year's production, the Japanese are carrying over approximately 425,000 cases of canned salmon of which approximately 280,000 cases are sockeye. The present price of Japanese sockeye 48  $\frac{1}{2}$ 's is C\$21.15 f.o.b. Japan, which may be compared with the current Canadian price of \$25.00. The 1961 Year Book Number of the Pacific Fisherman (a United States fishery trade periodical) makes the following observations with respect to the marketing of the 1960 pack:

"With so little to sell, as a result of one of the worst fishing years in provincial history, salmon marketers in British Columbia experienced a bleak and hungry season in the fall of 1960. It was certainly not a year when aggressive selling brought its usual rewards. Broadly speaking, the salesmen could have sat on their hands all year and come up with approximately the same results as if they had been really hustling.

"But the overpowering problem of salmon marketing in B. C. is the continuing prospect of consumer resistance to sky-rocketing prices. In 1958, the season of the big pack on the Fraser, export prices for sockeye halves averaged \$18.50 a case, which was considered relatively high at the time. In 1959 the price advanced to \$23.00 and in 1960 it rose to \$25.00. 'How long,' packers, brokers and exporters asked, 'could the market stand such steadily rising prices?'

"They had at least part of their answer during the season just passed because they found the United Kingdom, usually anxious to buy the limit on sockeyes, was for the first time shopping elsewhere--almost solely because of price. There were no large purchases by the United Kingdom wholesale houses at all. Nearly all the canned salmon marketed there from B. C. (British Columbia) went to the 'big label companies.' The United

Kingdom regarded halves disdainfully and bought virtually nothing in that category."

British Columbia cannerys are hoping for an average or better-than-average pack of all species in 1961. They are hoping also that it will be possible to achieve cost reductions and price reductions which will enable a start to be made on rebuilding the rate of canned salmon consumption in all of the markets which are served by British Columbia. This is an important objective for it is of interest and value to everyone in the industry if we can approach 1962 with a healthy market situation rather than the reverse.

\*\*\*\*\*

PLANS TO CONTINUE SUBSIDY ON  
DOGFISH LIVERS IN 1961/62:

Final reports on the dogfish liver subsidy for the fiscal year ending March 31, 1961, show that a total of 990,169 pounds of dogfish livers were landed in British Columbia between October 11, 1960, and March 31, 1961, and the total subsidy paid at the rate of 12 cents per pound amounted to C\$118,820.

The Canadian Minister of Fisheries announced on April 17, 1961, that the dogfish liver subsidy of 12 cents a pound had been reintroduced for the current year and a total of C\$150,000 had been earmarked by the Government to cover this fiscal year's subsidy program. This is the same amount that was appropriated for the 1959/60 fiscal year.

Note: Also see Commercial Fisheries Review, May 1961 p. 43.

\*\*\*\*\*

USE OF CITRIC ACID PERMITTED IN  
CANNED SPRING MACKEREL:

The Canadian Food and Drug Regulations (Paragraph B. 21.008) were amended by P.C. 1961-345 dated March 9, 1961, to permit the use of citric acid in canned spring mackerel with appropriate label declaration.



## Ceylon

FISHERIES TRAINING CENTER TO BE  
ESTABLISHED WITH AID OF JAPANESE:

An agreement was signed in Ceylon on March 20, 1961, by the Minister of Agriculture, Land, Irrigation and Power and the Japanese Ambassador whereby the Governments of Ceylon and Japan will establish a Fisheries Training Center at Negombo, a fishing town on the coast above Colombo. The project was originally offered by Japan in August 1958 and details were discussed in February 1960.

## Ceylon (Contd.):

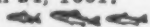
The training to be provided at the Center will provide: (1) courses in fishing gear for 20 trainees, every four months, selections being made by the Government of Ceylon from local fishermen who will in turn carry the benefit of their training to their fellow fishermen in their villages; (2) courses in the operation and maintenance of marine engines--ten trainees will be trained every year; and (3) instructions in general aspects of the fishing industry.

The Government of Japan is to send a training vessel and other equipment as well as eight Japanese experts. Capital aid from Japan over the three-year period of the agreement will amount to Rs.1.3 million (US\$274,000). The Government of Ceylon is to provide the buildings, accommodations, Ceylonese student staff, and running expenses, incurring capital expenditure of about Rs.250,000 (\$53,000) and annual recurrent expenditure of about Rs.60,000 (\$13,000).

The project should be of practical benefit to Ceylon if her fishermen are to keep pace with the mechanization program. Reports have been heard from time to time that they neglect the maintenance of the newly mechanized boats and that they are incompetent to handle modern gear. The agreement is applauded in the press which expresses the hope tinged with skepticism that the Government of Ceylon will promptly implement the establishment of the center and make further provision for the trainees ultimately to own their own gear and boats.

Japan has long been interested in the fishery potential of these waters and provided the recommendations incorporated in the Ten Year Plan section on the development of the fishery industry. Over a year ago a team of Japanese harbor experts visited Ceylon and drew up a report on the potential development of a network of small fishery harbors but nothing more has been heard of it since June 1960.

Japanese interests own 45 percent of a Ceylonese fishing company which catches tuna in northern waters for canning in Japan and export to the United States. This is something that the Ceylonese would like to be in a position to export direct and plans to expand facilities are under consideration, the United States Embassy to Colombo reported on March 24, 1961.



## Denmark

## EXPORTS OF FISH SOLUBLES, 1957-60:

Exports of fish solubles by Denmark rose sharply from 4,957 metric tons in 1957 to a peak of 23,426 tons in 1959 and dropped to only 233 tons in 1960.

Denmark's Exports of Fish Solubles, 1957-1960							
Year	Quantity					Total Value	
	United States	West Germany	Netherlands	Other	Total	1,000 Kr. <sup>1/</sup>	US\$ 1,000
	..... (Metric Tons) .....						
1960	-	216	226	48	490	233	34
1959	20,659	2,604	104	59	23,426	10,805	1,564
1958	10,080	3,341	64	599	14,084	6,562	950
1957	4,668	180	96	13	4,957	1,788	259

<sup>1/</sup> Danish kroner converted at rate of 6.908 kroner equal US\$1.

Growth of the export market for fish solubles was overwhelmingly dependent on United States demand, and when United States consumers switched to other suppliers at more competitive prices, the Danes dropped out of the market. Most of the herring-meal solubles at the Danish reduction plants are now being blended back into the meal, improving its quality.

There was no change in the export pattern during the first two months of this year, with shipments, mostly to the Netherlands and West Germany, totaling only 85 tons. Average f.o.b. export prices remain at 450-500 Kronur (US\$65-72) per metric ton, or unchanged from the boom years of 1958 and 1959.

\* \* \* \* \*

## SHRIMP PROCESSING METHODS:

In Denmark, the main types of frozen shrimp packed are: (1) raw, unpeeled, with or without head; (2) raw, peeled shrimp meat; (3) boiled, unpeeled, with or without head; (4) boiled and peeled.

Scandinavian deep-sea shrimp are mainly frozen after boiling and peeling. This presents a serious problem as regards the prevention of damage to meat quality during frozen storage.

Experiments by the Danes with American species of shrimp give evidence that processing before freezing markedly affects keeping quality during frozen storage. Deterioration increases with the length of boiling, and the salinity of the brine. Danish experiments have also shown that deterioration increases as salinity increases.

Investigations of freezing boiled and peeled shrimp have shown that storage life depends on the method of packaging. It is important that packaging material be air- and water-vapor-tight.



## Denmark (Contd.):

The best quality and longest storage life are obtained by vacuum packing in plastic bags. Some shrimp packages contain free air spaces. In such packages, shrimp lose water, which condenses as ice in the free air spaces. The resulting damage to quality may be delayed, if frozen shrimp is given an ice glaze before packaging.

In the Scandinavian canning industry, shrimp are processed by the wet pack method. Salt acid and sugar are the main ingredients of the brine in the can.

The shrimp meats are cooked before being packed in the can, otherwise weight loss will occur. Salt brines of varying concentrations are used for boiling shrimp prior to canning.

As the concentration of citric acid in the brine of the wet-packed canned shrimp fell, from 1 to  $\frac{1}{4}$  percent, the pH factor of the brine increased from 5.9 to 6.8. The drained weight of the finished product--in percentage of the fill-in weight of precooked shrimp--increased from 92 to 102.

In Denmark, shrimp waste has been found to contain as much as 14 percent crude protein, when processed in the traditional way. Shrimp meal with 10 percent water content contains 50 percent crude protein.

Shrimp waste, fed to egg-laying hens, produced a reddish-colored yolk.

The practice of boiling shrimp on board ship immediately after capture is in use in Norway and Sweden, but has been abandoned in Denmark, where shrimp are packed in wooden boxes, with crushed ice, and landed 1 or 2 days after being caught. In Denmark some shrimp are graded by machine into three sizes--large, which are hand peeled; medium, machine peeled; and small which are not processed.

Success of industrial shrimp processing depends, to a great extent, on the manner in which shrimp are cooked. Boiling for 2 minutes gives a weight loss less than half obtained by boiling for 6 minutes. When boiled, no more shrimp should be added than can flow freely. After 1-2 minutes in water at 100° C. (212° F.), shrimp come to the sur-

face. Boiling time at 100° C. (212° F.) should not exceed 3-4 minutes.

Shrimp are often boiled in varying degrees of brine.

Shrimp boiled within a few hours of catching have a firmer texture than those boiled after longer storage.

Danes find that the easiest method of peeling shrimp by hand is while they are still warm.

American peeling machines are now used for peeling red deep-sea shrimp, either raw, after 2-3 days' chilling in ice or ice water, or after a short cooking time to loosen the shell.

The weight loss of peeled raw shrimp boiled in a weak brine solution at 100° C. (212° F.), rose from 39 to 48 percent with boiling time increased from  $\frac{1}{2}$  to 4 minutes.

Raw shrimp boiled after peeling curls more than shrimp boiled before peeling.

The boiled, peeled shrimp can be freed of loose shell more effectively by air blowing, than by washing. An undesirable effect of cleaning in water is the loss of much surface coloration. (Meddelelse fra Fiskeriministeriets Forsoyslaboratorium, December 1960)



## Ecuador

## ADHERES TO INTER-AMERICAN TROPICAL TUNA CONVENTION:

The Ambassador of Ecuador deposited with the U. S. Department of State on April 7, 1961, the instrument of adherence by the Government of Ecuador to the Convention Between the United States of America and the Republic of Costa Rica for the Establishment of an Inter-American Tropical Tuna Commission. The Ecuadoran instrument of adherence stipulated that the effective date of adherence by Ecuador to the Convention shall be the date of deposit of the instrument, which was April 7, 1961. The adherence of Ecuador brings the number of countries signatory to the Convention to four. Panama adhered to the Convention on February 16, 1954. (United States Embassy, Quito, April 13, 1961.)

\*\*\*\*\*



## Ecuador (Contd.):

FISHING INDUSTRY, 1961:

The fishing industry in Ecuador continues to develop with a promising outlook for the future. The total 1960 catch was about 25 million pounds. While the shrimp industry continues to show the effects of several lean years and 1960 tuna production declined about 15 percent from 1959, both of these major industries are basically healthy and look forward to increased production in 1961. The sardine-canning industry shows little increase in production, although recent tariff protection afforded by the Government has caused an improvement in sales.

The fishing industry in Ecuador can be divided roughly into four components for reporting purposes: Shrimp; tuna; sardines; and miscellaneous fishing in canoes and small boats. The first three components, for which fairly reliable statistics are available, account for about 90 percent of the total Ecuadoran catch.

Total Ecuadoran tuna landings for 1960 were about 15.5 million pounds, of which about 40 percent was yellowfin and 60 percent skipjack tuna.

A small number of foreign-flag vessels reportedly did some tuna fishing in Ecuadoran waters during 1960. Two United States-flag vessels are employed by the dominant Ecuadoran tuna company as freezer ships only.

This firm, the only producer of fish meal, produced 943,000 pounds during 1960, all for domestic consumption.

Of the 1960 Ecuadoran tuna landings, about 12.8 million pounds were exported, about half being canned and half frozen. In the past, almost all of the exported tuna went to the United States, but in 1960 about 14 percent of Ecuadoran tuna exports went to the following new markets: Great Britain, West Germany, Panama, Guam, Jamaica, Belgium, and Greece.

About 27 Ecuadoran pole-and-line tuna vessels were in operation during most of 1960 with 5 or 6 additional vessels in repair and maintenance.

Of the 4 or 5 principal sardine canners in Ecuador, only two are operating with regularity, both in Guayaquil. The two plants,

which are very similar in size and equipment, with a capacity of about 1,680,000 pounds of canned sardines, produced about 750,000 pounds in 1960.

Both plants have automatic scaling machines and semi-automatic can sealers. Women workers are paid between 7.2-12.0 U. S. cents per 100 fish for cutting off heads, tails, fins, and removing entrails. The wholesale price of canned sardines sold by Guayaquil canneries is 39 U. S. cents a pound.

The sardine canners are very encouraged by a recent (January 1961) import tariff on foreign canned sardines. The leading canner said that he was 15 days behind in filling orders for the first time in the four years' existence of his plant. All of the canners look to the future with confidence.

A negative factor in this small industry is that the sardine canneries have no regular source of supply. They depend upon the enterprise of individual fishermen rather than their own fleet, which they are not yet big enough to afford. During the fall of 1960, almost three months went by during which the canneries were closed for lack of fish. At the present time, the two leading canneries would work 24 hours per day if they had more fish. Ecuadoran canners do not export any sardines. (United States Consulate, Guayaquil, March 27, 1961.)

*Notes: Statistics supplied by fishing industry may vary to a considerable extent from Government statistics.*

\* \* \* \* \*

SHRIMP INDUSTRY:

The Ecuadoran shrimp fishing industry has been depressed in recent years, due mostly to an increase in the number of vessels and a smaller catch per vessel. The decreased catch per vessel in 1958 and 1959 has resulted in lower profits and inadequate maintenance of vessels. For this reason, the fleet is presently not in good repair and construction of new vessels has stopped.

Shrimp industry executives in the Guayaquil area, who export almost 100 percent of their production to the United States, are extremely concerned about the proposed United States tariff on shrimp imports. One spokesman even said the tariff would be "the end of the Ecuadoran shrimp industry."

As of March 1961, there were five shrimp-processing plants in Ecuador. All of them have freezing facilities, but all processing is done by hand. There is no machinery for breeding or peeling. There is no discernible trend toward mechanization.

The total shrimp catch for 1960 was estimated at about 6 million pounds. The only reliable figures are those of organized shrimp fishing companies which export practically 100 percent of their production. The total landings by such companies in 1960 was about 4.5 million pounds. The differ-

## Ecuador (Contd.):



Port of Manta in Ecuador. In right background are a number of typical fishing vessels at anchor.

ence between the two figures given is accounted for by independent fishermen operating alone who keep no records.

The principal species caught and percentage of total catch are: white (50 percent); sea bob (40 to 45 percent); and tiger (5 to 10 percent).

Export prices (f.o.b. Guayaquil) for white shrimp (heads-off) during 1960 were approximately as follows: 10 count and under, 81-84 U.S. cents a pound; 15-20 count, 74-76 cents a pound; 21-25 count, 66 cents a pound; and 26-30 count, 61 cents a pound.

Wage rates for processing at Guayaquil's most modern plant is about 1.8 U.S. cents for deheading and packing a 5-pound carton. The rate at this plant is lower because they have a sorting machine. At other plants, where sorting by size must be done by hand, the rate for sorting, deheading, and packing is 3 cents per 5-pound carton. The rate for peeling is 0.6 cents per 5-pound box. All of the foregoing work is done by women.

Wage rates for shrimp fishermen at a representative company are based on the position in the crew, experience and nationality, size of trip, and size and species of shrimp landed.

Wages of Ecuadorans catching white shrimp for the representative company were: captain, \$36 per 1,000 pounds; engineer, \$12 per 1,000 pounds; and crewmen, \$9 per 1,000 pounds.

A Puerto Rican captain was paid 14 percent of an amount equal to 50 cents a pound after first subtracting the cost of fuel for the vessel and food for the crew. A Mexican captain was paid a flat 5 cents a pound.

Wage rates for catching other species of shrimp equal as little as 30 percent of the white shrimp rate.

The best possibility for expanding the shrimp production of Ecuador is in fishing deeper offshore waters. Present fishing vessels operate only in shallower waters due to the limitation of their gear and the dictates of local custom. A local shrimp expert estimates that such expansion would be substantial. (United States Consul in Quayaquil, March 7, 1961.)



## France

FISH MEAL AND OIL PRICES,  
FIRST QUARTER 1961:

Average fish meal and oil prices reported for the first three months of 1961 by the

## head of the French Fish Meal Manufacturers Association:

Product	Protein Content %	Price	
		NF/Metric Ton	US\$/Short Ton
<b>Fish Meal:</b>			
French fish meal 1/	55	450-470	82.81-86.48
" " " 1/	60	500-530	92.01-97.53
" " " 1/	65	600	110.41
Peruvian fish meal 2/	60-65	520-600	95.69-110.41
Angola fish meal 2/	65	540-580	99.37-106.73
Norwegian herring meal 2/	73	700-750	128.81-138.01
	<b>Fatty Acid Content %</b>		
<b>Fish Oil:</b>			
French oil (herring, dark)	10	550	101.21
French oil (herring, light)	5-6	600	110.41
1/Ex-plant loaded aboard car or truck, 15 metric tons minimum.			
2/Loaded aboard car French port, customs paid, 15 metric tons minimum.			
Note: Values converted at rate of 4.93 new francs equal US\$1.			

From January to February 1961 average prices for fish meal increased about 3.9 percent and in March prices were up about 5.4 percent from January. (United States Embassy, Paris, April 7, 1961.)



## German Federal Republic

TRAWLER TRADE SEEKS LARGE  
SCALE GOVERNMENT SUPPORT:

The financial deterioration of the West German trawler trade was the subject of a memorandum submitted by the Association of German Deep-Sea Fisheries to the legislative and executive branches of the West German Government early this year.

In its memorandum the Association pointed out that the over-all trawler fish catch dropped 28 percent from 1955 to 1960. During this period, the catch of herring, traditionally considered the economic backbone of the trawler trade, dropped 64 percent, while the white fish catch rose only 6 percent. Gross proceeds of the catch dropped 8.5 percent from 1955 to 1960. On the other hand, the Association claimed, production costs increased progressively from 1955 to 1960. On the basis of criteria established in a Government investigation of the financial position of the West German trawler trade in 1957 and 1958, the Association arrived at the conclusion that the 1960 gross proceeds were DM 25 million (US\$6 million) below production costs, including overhead and depreciation.

### German Federal Republic (Contd.):

The Association claimed that the deterioration of the trawler trade's income is attributable to several causes:

1. The fish take from traditional, nearby fishing grounds has declined significantly because of changes in hydrobiological and climatological conditions and because of the extension of national fishing limits.
2. The loss of fish catches in traditional waters has been offset only to a limited extent by expanded fishing in distant waters.
3. The necessity to build trawlers equipped to operate in distant waters has increased construction costs to about DM 4.5 million (\$1.1 million) per vessel as compared with DM 2.5 million (\$600,000) for conventional trawlers, and has led to a disproportionately high indebtedness of the trade. The Association claimed that because of the rapid change in trawler operations, vessels which were built before 1955 (about 60 percent of the West German trawler fleet) are now obsolete. Although these vessels are still in good shape and their write-off for depreciation has not yet been completed, they can be used only in less productive, nearby fishing grounds. The burden of renewal of the trawler fleet weighs all the more heavily, according to the memorandum, because the financial resources of the trawler trade were depleted to a large extent in rebuilding the 80 percent of the fleet destroyed in World War II and in replacing unproductive trawlers built in early postwar years under occupation specifications. Even before the building of new factory trawlers for operation in distant waters started, a Government investigation showed that only 13 percent of the total assets of the trawler trade was owned by the trade itself.
4. Nearly complete liberalization of fish, which permitted imports to rise 76.3 percent over the 1955 level, has had a depressing effect on prices, particularly because imports often were allowed to enter the country with little or no regard to domestic fish supply conditions at the time of entry. The fish-meal price slump, claimed the Association, in turn induced Danish and Swedish fishermen to step up significantly their landings of edible fish in German ports. With regard to the timing of imports, the coordination of Icelandic fish landings in German ports with West German trawler operations has failed to produce satisfactory results, and the voluntary coordination of operations and fish landings of the West German trawler fleet has therefore been rendered ineffective. Liberalization of fish imports has, according to the Association, reduced the domestic share in the total West German fish supply by 32 percent from 1938 to 1960. Moreover, competition from imported fish is in many instances considered unfair by the Association because of the subsidization of fisheries in countries such as Iceland and Great Britain.
5. Substantial losses were incurred by the trawler trade as a result of the slump in fish-meal prices which reduced its returns for fish sold to the reduction industry and which impaired the profitability of fish-meal plants installed aboard many trawlers.

In its memorandum the Association pointed out that the trawler trade has endeavored to cope with its difficulties in many ways. Through the fusion of independent firms and the establishment of cooperatives, the number of trawler companies has been reduced from 40 in 1938 to 19 in 1961. Total investments in the modernization of the trawler fleet since 1949 have accumulated to more than DM 400 million (\$96 million). The trawler trade has adopted coordinated fish catching and landing programs and has also established a joint sales organization. A total of DM 5 million (\$1.2 million) has been spent by the trade to promote the freezing of fish and to further fish exports. In addition, the trade has introduced self-imposed quality standards. For sever-

al years the trawler trade has made contributions to a joint fish advertising and fish sales promotion organization at the rate of DM 0.80 (19 U.S. cents) a metric ton. Only recently, the trawler trade decided to introduce an additional levy of DM 10.00 (\$2.40) a ton to intensify fish sales promotion.

The rapid technical progress of the West German trawler fleet in recent years will make a further increase in productivity a slow and tedious process, claimed the Association, and competition from other protein foods forbids any significant increase of fish prices. In view of these facts, said the Association, the following Government assistance is requested.

1. In order to improve trawler fleet operations, the annual Government appropriation for exploratory fishing and the testing of pelagic fishing gear should be increased from DM 415,000 (\$99,600) to DM 4 million (\$960,000) for a three-year period. In addition, annual Government subsidies on interest rates for commercial loans used for adapting trawlers to distant-water operations should be increased for the next three years from DM 270,000 (\$64,800) to DM 400,000 (\$96,000). The Association also requested Government credit guarantees and grants in the amount of DM 3.5 million (\$840,000) per year for the promotion of domestic fish consumption, as well as guaranteed, interest-subsidized loans of DM 5 million (\$1.2 million) to finance the carrying of frozen fish stocks.
2. In order to tide the trawler trade over its momentary financial ebb, the Government should grant emergency credits at 2 percent interest per annum (analogous to aid granted to farmers for crop failures) for the consolidation of maturing bank loans. As additional relief for a three-year period, the Association requested the extension of Diesel fuel subsidies currently granted to the lugger and cutter fisheries to the trawler trade (cost about DM 4 million or \$960,000 per year), as well as the subsidization of coal used by 40 percent of the fleet (estimated expense about DM 7.5 million or \$1.8 million per year).
3. In the realm of foreign trade policy, the Federal Government should in bilateral trade agreements include provisions that would regulate the timing, the quantities, and the pricing of fish imports and see to it that administrative restrictions on West German fish landings in foreign countries are removed. Further, the Government was requested to introduce an import levy on fish meal, and to subsidize West German fish exports to the extent of DM 4-5 million (\$960,000-1,200,000) per year. Finally, the Association proposed the use of Government loans for the construction of facilities to dry fish, which would then be exported to developing countries under West Germany's forthcoming foreign aid program.

<sup>1/</sup> These are the amounts that were prorated to the West German trawler trade under Government support extended to the entire West German fishing industry for exploratory fishing and the modernization of fishing vessels.  
Note: Values converted at rate of DM 1 equals 24 U.S. cents.

\*\*\*\*\*

### FISH MEAL PRICES, APRIL 7, 1961:

Prices reported at Hamburg Commodity Exchange as of April 7, 1961, for fish meal delivered ex-Hamburg warehouse, or c.&f. West German sea port (see table on following page).

As compared with March 10, 1961, fish meal prices on the Hamburg exchange on April 7, 1961, ranged from unchanged to slightly lower for both domestic and imported fish meal. (United States Consulate, Bremen, April 10, 1961.)

## German Federal Republic (Contd.):

Type of Fish Meal	Protein Content (%)	Delivery	DM/Metric Ton	US\$/Short Ton
German fish meal.....	50-55	prompt/Apr. 1961	455	103.19
" " " .....	55-60	" Apr. 1961	460	104.33
" " " .....	60-65	" " "	465	105.46
" " Std. brands..	60-65	Apr. 1961	472.50	107.16
Icelandic cod .....	65-70	Apr.-June 1961	580	131.54
" herring .....	70-75	Aug.-Oct. 1961	595	134.95
Peruvian fish meal .....	65-70	prompt/Apr. 1961	437.50	99.23
" " " .....	65-70	May-June 1961	450	102.06
" " " .....	65-70	July-Dec. 1961	470	106.60
Danish herring meal ..	72-75	Apr.-May 1961	605	137.21
" " " .....	72-75	June-Sept. 1961	597.50	135.51

Note: Values converted at rate of 4.0 deutsche marks equal US\$1.



## Ghana

## EXPANSION OF FISHERIES AIDED BY GOVERNMENT PLANNING:

Ghana, rapidly mechanizing and modernizing its fishing industry, has also been considering an age-old problem--once production is increased, what should be done with the fish?

The Ghanaians are traditionally the fishermen of the West Africa coast, and it is estimated that 20 percent of the population is involved in some branch of the fishing industry.

As the major new ports at Tema and at Elmina swing into production, the Ghanaians who now yearly catch fish valued at about £2,300,000 (US\$6,440,000), will need new marketing methods to dispose of their increasing catches.

Large quantities of herring are already caught between June and September each year and there are ample indications that this season can be extended for 8 or 9 months. Abundant schools of tuna also appear the year round off the coast.

To aid the new independent African State in planning its industrial growth in fisheries, a fish-marketing expert from New South Wales, Australia, and the Food and Agriculture Organization (FAO), has been in Ghana helping to improve its fish marketing system.

The Government has introduced mechanized vessels in anticipation of increasing

production and the FAO expert advised on the type of shore installations needed for handling the additional landings and the best methods of distribution to benefit both the consumer and the producer. In his survey of the present Ghana fish marketing system he noted that it was too well established and complex to be changed quickly.

At present, the trade is completely controlled by the traditional women fish-mongers, who keep no records of any type, act as agents for the fishermen, and sell their catches.



Fishing canoes on a beach in West Africa.

The Government, following the FAO expert's advice to set up a pilot market, has built a modern market at Takoradi, which is at present the main base for the mechanized fleet.

Under the new set-up, the market acts as agents for the fishermen, selling the fish directly to the women traders at a negotiated price. In return, the traders, who have been



## Ghana (Contd.):

able to handle only a small amount of fish in the past, are provided with ice and cold storage facilities to help them extend their business.

An early task undertaken by FAO's representative was to find out the number of canoes and fishermen in Ghana. He and his Ghanaian assistant visited every port of landing in Ghana. They counted 8,956 canoes, and estimated 67,000 fishermen to man them. This represents a very dense fishing population for Ghana's 360 miles of coast.

The FAO marketing specialist also surveyed the main fish markets in Ghana to determine the quantity of fish sold, its distribution through surrounding districts, whether the markets could handle more fish as production increased, and the number of people involved in marketing. At Kumasi, the largest market of its kind in Africa, he found a maximum of 919 women fish traders--a staggering number of traders even for a huge market. The minimum number of traders selling was 103--counted on a rainy day.

Although the survey showed that the cocoa growing area around Kumasi could absorb much more fish, the Kumasi market is too congested to accommodate more trade. It was suggested that the retail and wholesale trade be separated at Kumasi and other principal markets, and that the retail trade should be suburbanized.

Ghana's yearly catches are valued at about £2.3 million, but the country still imports £2.5 million (\$7 million) worth of fish, which is the main and cheapest source of protein for many Ghanaians.

The prices fluctuate, but during the herding season they drop to a level that anyone can afford. The Ghana Government has a very sound and farsighted fisheries policy for both the country's need and to develop an export trade. There are already 160 small mechanized vessels in use and the Government plans to launch a loan scheme to help the fishermen put outboard motors on their canoes.

It is also planned to develop the industrial side of the fishing industry by building a canery and edible fish-meal plant, and a large

freezing plant which could handle tuna for export. (Ghana Daily Graphic, April 11, 1961.)

The principal aspect of fish marketing, which is not covered above, is the effect on the market of the substantial sales of frozen fish from Soviet and Japanese vessels operating in nearby waters. This fish is sold direct to the women traders in Accra, Tema, and Takoradi either at the pier or from private cold-storage plants. Despite the fact that the fish from the Soviet trawlers is regarded as imported and thus pays duty at 10 percent ad valorem, it has usually been sold at below the going price for Ghanaian-caught fish. Some of the Japanese boats operate under the Ghanaian flag and thus avoid the payment of duty.

To compete with this cheap Russian and Japanese fish, the local fisheries will have to be better organized and better equipped. The Ministry of Agriculture and the Agricultural Development Corporation are developing programs to this end, and the United Ghana Farmers Council is expected to launch a fisheries cooperative with modern equipment. (United States Embassy in Accra, April 12, 1961.)



## Iceland

## FISHERY PRODUCTS EXPORT TO SOVIET BLOC, 1960:

Iceland's exports of fishery products and byproducts to countries of the Soviet Bloc during the calendar year 1960 amounted to 54,048 metric tons, with f.o.b. value of about 508.9 million kronur (about US\$13.4 million at current rate of exchange of 38.0 kronur to US\$1). (See table.)

A decline in Iceland's trade with the Soviet Bloc countries which appeared during the first six months of 1960 continued until the end of that year. Over-all trade in both directions with the Bloc dropped from 31.8 percent of total trade with all countries in 1959, to 22.9 percent during 1960. The Soviet Bloc share of all imports decreased from 30.6 percent during calendar year 1959 to 22.7 percent in 1960. At the same time exports to the Bloc countries for those years dropped from 33.7 percent of total exports to 23.1 percent.



## Iceland (Contd.):

Icelandic Exports of Fishery Products to Soviet Bloc, 1960										
Product	Country of Destination									
	Czechoslovakia		East Germany		Poland		Rumania		U. S. S. R.	
	Quantity	F.o.b. Value/	Quantity	F.o.b. Value/	Quantity	F.o.b. Value/	Quantity	F.o.b. Value/	Quantity	F.o.b. Value/
	Metric Tons	1,000 IKr.	Metric Tons	1,000 IKr.	Metric Tons	1,000 IKr.	Metric Tons	1,000 IKr.	Metric Tons	1,000 IKr.
Fish, frozen . . .	4,159	47,463	5,654	64,215	-	-	-	-	27,341	314,168
Herring, frozen .	-	-	2,417	6,868	3,129	8,903	360	1,783	-	-
Herring, salted .	-	-	1,000	3,435	-	-	536	1,968	4,922	24,079
Stockfish . . . .	-	-	10	144	-	-	-	-	-	-
Fish, canned . . .	170	9,625	7	312	-	-	-	-	-	-
Fish meal . . . .	738	2,655	-	-	-	-	-	-	-	-
Herring meal . . .	1,436	6,608	-	-	600	1,859	-	-	-	-
Cod-liver oil . . .	1,169	11,050	-	-	400	3,716	-	-	-	-
Total . . . . .	7,672	77,401	9,088	74,974	4,129	14,478	896	3,751	32,263	338,247

Values in terms of US\$ are difficult to determine due to complicated exchange rates in effect between January 1 and February 27, 1960.

Iceland however, closed the year 1960 with an import surplus from the Bloc countries of Icelandic kronur 166 million compared with Icelandic kronur 116 million in 1959. Taking the devaluation into consideration, the import surplus with the Bloc countries was to some extent reduced during 1960. (United States Embassy, Reykjavik, March 23, 1961.)

\*\*\*\*\*

#### WESTMAN ISLANDS FISHING TIE-UP ENDED:

The general fishing tie-up on Iceland's Westman Islands, which had lasted nearly six weeks, came to an end on March 1, 1961, when a settlement was reached with the Women's General Workers Union. Thousands of fishermen and shore workers soon streamed back to this important fishing center--and production began in earnest for the remainder of the main season which ends about May 15. (United States Embassy, Reykjavik, March 13, 1961.)



#### India

##### NATIONAL COMMITTEE SET UP FOR OCEANIC RESEARCH:

One of two new National Committees set up in India by the Ministry of Scientific Research and Cultural Affairs is the National Committee for Oceanic Research.

Its functions will be: to draw up a coordinated plan for India's participation in the International Indian Ocean Expedition; to advise on allocation of the program be-

tween departments of government, research organizations, and university laboratories; to consider and approve a detailed plan for research in the several scientific disciplines related to India's participation and to recommend financial grants; to promote and coordinate the research programs; and to advise the government generally on all matters connected with India's participation in the expedition. This committee will also function as the National Committee for all oceanographic work. (United States Embassy, New Delhi, April 10, 1961.)



#### Italy

##### CANNERS SEEK INSPECTION AND CLAIMS SYSTEM FOR JAPANESE FROZEN TUNA IMPORTS:

The Japan Export Trade Promotion Agency reports that Italian canned tuna packers, after meeting in Rome to discuss procedures for purchasing Japanese tuna, submitted a proposal to their Government regarding the establishment of a system to inspect Japanese frozen tuna imports. Italian canners hope to establish means of settling claims against green meat tuna, fix rates of conversion for claims against green meat fish, and work out an inspection system.

Consensus is that the canner's proposal will encounter numerous difficulties in actual practice, although it is expected that a system such as that in effect in the United States shall gradually be adopted. (Suisan Keizai, March 30, 1961.)

\*\*\*\*\*

## Italy (Contd.):

IMPORTS OF JAPANESE FROZEN  
TUNA ON DUTY-FREE BASIS  
SET AT 14,000 TONS:

Under a recent GATT (General Agreement on Tariffs and Trade) agreement, Japan can annually export 14,000 tons of frozen tuna to Italy on a duty-free basis. Exports exceeding this quota, which is based on Japanese exports to Italy in 1958, can be admitted free of duty by the Italian Government under the agreement covering special exemptions adopted in Rome in March 1960.

## Japan

## CANNED TUNA EXPORTS, 1955-59:

Japan's total exports of canned tuna increased each succeeding year from 1955 to 1959. In 1959, Japan exported 3.5 million cases valued at US\$28 million. Steadily rising exports of light meat tuna packed in oil and packed in brine accounted for this increase. Exports of white meat tuna in brine remained somewhat stable, while exports of white meat in oil declined sharply after 1957 due principally to the higher duty status for United States imports of tuna in oil. Exports of white meat

Japan's Exports of Canned Tuna, 1955-59

Item	1959		1958		1957		1956		1955	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
	1,000 Cases <sup>1/</sup>	US\$ 1,000	1,000 Cases <sup>1/</sup>	US\$ 1,000	1,000 Cases <sup>1/</sup>	US\$ 1,000	1,000 Cases <sup>1/</sup>	US\$ 1,000	1,000 Cases <sup>1/</sup>	US\$ 1,000
<b>White Meat:</b>										
In oil .....	283.3	2,292	271.7	1,915	435.3	2,725	252.7	2,010	183.7	1,301
In brine .....	1,014.4	10,371	1,339.4	11,428	1,186.5	10,364	1,028.5	9,316	907.9	8,310
In jelly .....	19.9	132	36.5	247	32.8	206	-	-	-	-
<b>Light Meat:</b>										
In oil .....	1,158.5	7,092	607.7	4,200	823.3	4,931	650.9	4,255	288.4	1,785
In brine .....	1,038.6	7,500	813.0	6,055	720.6	5,306	682.7	5,033	588.1	4,389
In jelly .....	16.0	82	92.9	511	-	-	-	-	-	-
In tomato sauce .....	13.2	85	27.9	190	-	-	-	-	-	-
Total all types .....	3,543.9	27,554	3,249.1	24,546	3,198.5	23,532	2,614.8	20,614	1,968.1	15,785

<sup>1/</sup>Packed 48 7-oz. cans per case.

Note: White meat - albacore only. Light meat - yellowfin, big-eyed, and skipjack tuna.

Both Japan and Italy favored having all frozen tuna exports to Italy admitted free of duty. France and some other nations were opposed. As a result, Japanese frozen tuna exports to Italy exceeding the established duty-free quota of 14,000 tons can be taxed by the Italian Government, if it wishes to do so.

The selection of the 1958 export record as a basis for determining amounts of frozen tuna which can be exported free of duty to Italy means that tuna exports to member nations of the European Common Market, such as France, West Germany, Netherlands, Belgium, Luxembourg, etc., would now very likely be subject to an import duty since frozen tuna was not exported to those countries in 1958. According to available information, Common Market nations are reported to be considering a frozen tuna import tax of 7.5 percent for 1962, which would successively be scaled to go up to 15 percent and 25 percent ad valorem. (*Suisan Tsushin*, March 30, 1961.)



and light meat packed in jelly, and light meat packed in tomato sauce declined in 1959.

\*\*\*\*\*

CANNED TUNA EXPORTS  
TO UNITED STATES:

The Tokyo Canned Tuna Sales Company late in March 1961 was taking temporary consignments of canned tuna for the first quarter of the new fiscal year (April 1, 1961, to March 31, 1962). Consignments in that month barely totaled 110,000 cases due to a poor winter albacore fishing season. Including the carry-over (primarily B-grade white meat), the total stocks on hand amounted to about 200,000 cases, which were to be sold at the fifth sale of canned tuna scheduled for late April.

Packers indicated that they will seek drastic changes in the sales system, but had not yet submitted any specific proposals. The Sales Company was considering the fifth sale for an agreement between exporters and pack-

## Japan (Contd.):

ers on the latter's proposal, which was expected to be submitted soon.

At the canned tuna sales committee of Japan Canned Food Exporters Association held on March 9, it was decided to complete Sale No. 4 to the United States for 200,000 cases of whitemeat canned tuna only, same price as before, for shipment by the end of April. This completed the plan of selling 600,000 cases of canned tuna in the first quarter of 1961 (last quarter of 1960 Japanese fiscal year). A total of 800,000 cases were sold to the United States since Sale No. 1 conducted in December 1960. (Suisan Tsushin, March 25 and other Japanese periodicals of March 10, 1961.)

\*\*\*\*\*

#### FROZEN AND CANNED TUNA EXPORTS, 1947-1959; 1935-1939 AVERAGE:

Japan's exports of frozen and canned tuna have increased steadily since 1947. In 1950, the prewar 1935-1939 average was exceeded for the first time for both canned and frozen.

tuna in oil to Canada for FY 1961 (April 1, 1961 to March 31, 1962). According to MITI, canned tuna for export must be sold at or above established prices.

Japan Canned Foods Exporters Association has set the check price (floor price) for white meat tuna in oil to Canada at \$8.65 per case (48 7-oz. cans) f.o.b. Japan and light meat tuna in oil at \$7.40 per case (48 7-oz cans) f.o.b. Japan. These prices are the same as last year's prices. (Nippon Suisan Shimbun, April 3, 1961.)

\*\*\*\*\*

#### EXPORTERS ASSOCIATIONS ESTABLISH 1961/62 FROZEN TUNA EXPORT QUOTAS TO U. S.:

The Japan Frozen Foods Exporters Association plans to export 95,000 short tons of frozen tuna (consisting of 35,000 tons of albacore and 60,000 tons of yellowfin) to the United States in 1961/62 (April 1, 1961, to March 31, 1962). The albacore quota is to be made up of 30,000 tons of direct shipments from Japan proper and 5,000 tons of transshipments. Half of the yellowfin quota (30,000 tons) is to come from Atlantic Ocean sources.

The total quota of 95,000 tons is to be allocated to Association members on the basis of their 1958-1960 export records.

Table 1 - Japanese Exports of Frozen and Canned Tuna<sup>1/</sup>, 1947-1959; 1935-1939 Average

	Frozen			Canned	All Exports Converted to Whole Tuna
	Direct Exports from Japan	Shipments to Europe (Metric Tons)	Transshipped to U. S.	Cases	Metric Tons
1959	67,035	22,499	16,156	3,543,951	187,892
1958	79,812	10,846	5,474	3,249,139	168,293
1957	70,940	11,483	-	3,198,502	160,155
1956	61,447	-	-	2,614,774	120,316
1955	71,827	-	-	1,968,053	115,809
1954	63,645	-	-	1,749,374	100,566
1953	45,874	-	-	1,788,382	81,784
1952	30,607	-	-	1,274,879	60,864
1951	24,457	-	-	634,432	41,244
1950	13,663	-	-	1,545,820	51,300
1949	2,957	-	-	211,526	8,847
1948	2,350	-	-	72,560	4,745
1947	312	-	-	-	2/
1935-1939 Average	3,861	-	-	435,168	14,925

<sup>1/</sup>Includes skipjack tuna, which is generally listed separate from other tuna in Japanese statistics.

<sup>2/</sup>Not available.

Exports of frozen and canned tuna reached their peak in 1959. Shipments to Europe and transshipments to the United States indicate the exploitation of tuna resources in the Atlantic by Japanese tuna vessels (table 1).

\*\*\*\*\*

#### FLOOR PRICES FIXED FOR EXPORTS OF CANNED TUNA IN OIL TO CANADA:

On March 30, the Japanese Ministry of International Trade and Industry (MITI) announced regulations for exports of canned

Each member is to place in the custody of the Association 65/95 of their allotted quota. This totals 65,000 tons, of which 35,000 tons (5,000 tons of albacore, 30,000 tons of yellowfin) are to be set aside for transshipments and 30,000 tons for direct shipments from Japan proper. The Association would release these fish upon receiving requests for their release from its members.

The Association officially adopted the plan at a special general session held on March 17.

The Association also plans to export 40,000 tons of tuna to Europe, as well as 5,500 tons of swordfish and 3,600 tons of tuna loins and discs to the United States, in the fiscal year.

A proposal was made at the March 17 meeting to station JETRO (Japan Export Trade Promotion Agency) personnel

## Japan (Contd.):

at Puerto Rico and negotiations are to be conducted for this purpose. (Suisan Tsushin, March 8 & March 18, 1961; Shin Suisan Shimbun Sokuho, March 18, 1961.)

The Export Frozen Tuna Fisheries Association's board of directors met on March 8 in Tokyo and passed the following proposals, which were later ratified at a special general meeting of the Association held on the same day, concerning the distribution of 95,000 tons of frozen tuna to be exported to the United States in 1961.

Shipments made directly from Japan: (1) Albacore export quota to the United States (30,000 tons) shall be allocated to Association members as follows: 26,000 tons to companies on the basis of their performance records; 3,900 tons unassigned (so-called free quota), and 100 tons on reserve. (2) Yellowfin export quota to the United States (30,000 tons) shall be distributed in the following manner: 24,000 tons to firms on the basis of their performance records; 5,900 tons unassigned (free quota), and 100 tons on reserve. (3) Export quota of loins for the United States (3,600 tons) shall be distributed in the following manner: 3,400 tons to firms on the basis of their past records, 185 tons unassigned, and 15 tons on reserve.

Transshipments: (1) Vessel trips for freezer vessels hauling frozen tuna to the United States via intermediate ports shall be restricted to a total of 120 trips (based on a quota of 5,000 tons of albacore and 30,000 tons of yellowfin). (2) Numbers of trips each carrier can make shall depend on its cargo-carrying capacity. Carriers with cargo capacities of less than 150 tons shall be limited to five trips (with special permission from the Association's board of directors required to make up to eight trips); 150- to 250-ton cargo capacity vessels shall be restricted to four trips each; 250- to 550-ton cargo capacity vessels three trips, and vessels with over 550-ton cargo capacity two trips. (Suisan Tsushin, March 9, 1961.)

\*\*\*\*\*

## FRANCE MAY IMPORT FROZEN TUNA:

France has put out unofficial feelers through a Japanese firm for importing Japanese frozen tuna. France has not specified the amount of tuna she would like to import, except that the import would take place after June. Also, 80 percent of the fish should be made up of dressed fish and the remaining 20 percent transshipments.

France imposes a high import tax of 33 percent on frozen tuna. For this reason a number of feelers put out by France in the past to import Japanese tuna have not materialized. (Shin Suisan Shimbun, April 10, 1961.)

\*\*\*\*\*

## FROZEN TUNA EXPORT AGREEMENT WITH CZECHOSLOVAKIA SIGNED:

A large Japanese fishing company has signed an agreement with Czechoslovakia to deliver 1,050 metric tons of Atlantic Ocean yellowfin tuna in June 1961. Price to be about \$290 a metric ton c.i.f. Heretofore, Japanese frozen tuna trade with Communist-

bloc nations has been limited to Yugoslavia only, and this is the first sale to Czechoslovakia. (Shin Suisan Shimbun Sokuho, April 18, 1961.)

\*\*\*\*\*

## PRODUCERS APPLY FOR PERMISSION TO SHIP FROZEN ATLANTIC OCEAN TUNA TO JAPAN:

The Japanese Export Frozen Tuna Producers Association has requested the Fishery Agency to authorize them to transport about 500 metric tons of frozen yellowfin, big-eyed tuna, and black marlin from the Atlantic Ocean to Japan. This request, second of its kind, involves the vessels No. 2 Akitsu Maru (994 gross tons) and Sagami Maru (1,007 gross tons).

The Fishery Agency was expected to approve this request since the objective of this plan is to help stabilize overseas tuna markets by diverting Atlantic Ocean tuna to Japan. Some time ago, the Fishery Agency approved a similar request for the Otsu Maru (8,000 gross tons). The Otsu Maru was due to arrive in Tokyo in late April with 800 tons of Atlantic Ocean tuna.

Akitsu Maru was to depart Las Palmas, Canary Islands, on May 1, and arrive in Japan around June 10. She was to pick up 387 tons of tuna from No. 18 Banshu Maru. Under joint-selling agreement terms, price for yellowfin and big-eyed tuna is \$158 a ton and for black marlin \$250 a ton (for delivery to Akitsu Maru).

Sagami Maru was scheduled to depart Port-of-Spain, Trinidad, in early May and was expected to arrive in Japan around May 30. This vessel was to bring back about 120 tons of frozen tuna. (Suisan Keizai Shimbun, April 18, 1961.)

\*\*\*\*\*

## BLUEFIN TUNA FISHING IN INDIAN OCEAN:

Bluefin tuna fishing picked up in the Indian Ocean after February 25, with many vessels reporting excellent catches of nearly 10 metric tons a day. About 25 vessels were fishing in the vicinity of 97° E. to 101° E. longitude and 27° S. to 28° S. latitude early in March.

Total fleet landings, however, were not expected to be large, for many vessels left that area when fishing was poor elsewhere.



## Japan (Contd.):

Those vessels were reported to have headed for the Arabian Sea and the eastern Pacific Ocean to fish for big-eyed tuna. (Nippon Suisan Shimbun, March 10, 1961.)

\*\*\*\*\*

## CLAIMS AGAINST FROZEN TUNA DECREASING IN UNITED STATES:

The Japanese Export Frozen Tuna Fisheries Association compiled data on claims made in 1960 against Japanese yellowfin tuna

Product	1960		1959	
	Trans-shipments	Japan Shipments	Trans-shipments	Japan Shipments
	(Percent)			
Yellowfin:				
Cilled & gutted	3.4	4.5	10.3	4.7
Dressed . . . .	10.0	7.1	22.3	6.8
Fillets . . . .	15.9	-	34.0	8.3

imported by the United States canneries. According to the Association, claims have declined considerably. (Suisan Tsushin, March 13, 1961.)

\*\*\*\*\*

## DELEGATION STUDIES SITES FOR OVERSEAS TUNA BASES:

The Shizuoka Prefectural Government in Japan is dispatching an observation party of four (composed of prefectural government and tuna industry members) to study the feasibility of establishing overseas tuna fishing bases in the South Pacific Ocean and Indian Ocean. This party was expected to leave Japan on April 25, and visit such places as New Caledonia, Santo Island (off east coast of Australia), Malaya, and Ceylon, and return about May 20.

Shizuoka Prefecture, which has about 200 registered vessels fishing for bonito and tuna-like fishes, is seeking overseas bases for the first time in hopes of stabilizing operations of these vessels. Other prefectures, like Mie and Kanagawa, have established foreign tuna-fishing bases in Malaya and Ceylon. These prefectures are reported to have obtained considerable success in expanding operations of their 100-ton class tuna vessels, although some hold the opinion that these operations are not completely successful due to problems involving fund transfers.

Principal sites to be studied as possible fishing bases are Santo Island on the east

coast of Australia; Penang, Malaya; Colombo, Ceylon; and Cochin on the southwest coast of India. (Suisan Keizai Shimbun, April 12, 1961.)

\*\*\*\*\*

## EQUATORIAL ATLANTIC OCEAN TUNA FISHING TRENDS:

The Kanagawa Prefecture Fisheries Experimental Station in Japan late in March 1960 released the following report on tuna fishing by Japanese vessels around the equator in the Atlantic Ocean.

Up to 1959, Japanese vessels operating in the area numbered 20-30 a month, but they suddenly increased in 1960 to 54 in June and to 58 in October. After that, the number stabilized at around 55 every month. Seasonally, there are more vessels operating in July-December than in January-June.

The number of tuna vessels that touch at Freetown, Sierra Leone, and Dakar, French Senegal, for refueling has been rapidly increasing. In addition, the vessels have begun to use Las Palmas (Spanish Canary Islands), Zuara (Libya), Montevideo (Uruguay), and Mahdia (Tunisia). Las Palmas seems to be most suited for a supply port. The leading ten ports where the largest number of Japanese tuna vessels docked during 1960 were as follows:

Port-of-Spain (Trinidad), Cristobal (Panama), Freetown (Sierra Leone), Dakar (Senegal), Recife (Brazil), Toulon (France), Trapani (Sicily), Koper (Yugoslavia), Mar del Plata (Argentina), Palermo (Sicily). (Japanese newspaper, March 25, 1961.)

\*\*\*\*\*

## LARGE FISHERY FIRM TO BUILD TWO LARGE TUNA VESSELS:

The second largest fishing company in Japan is planning to construct two tuna-fishing vessels in the 300-ton class. Each are to be equipped with 550 horsepower main engines. Target date for their completion has tentatively been set for September 1961.

In addition, the same firm is planning to build a 300-ton trawler. (Shin Suisan Shimbun Sokuho, March 9, 1961.)

\*\*\*\*\*



## Japan (Contd.):

## NUMBER OF PORTABLE VESSELS ON TUNA MOTHERSHIPS UNDER STUDY:

The Japanese Fishery Agency is considering proposals to revise regulations on the number of portable fishing vessels which large distant-water tuna mothership fishing vessels can carry. Tuna vessels cannot carry more than two portable vessels under existing regulations, but owners of large distant-water tuna fishing vessels of 1,000 tons or more hope to have this restriction lifted so as to increase operating efficiency.

The Fishery Agency is reported to be considering separate regulations for tuna motherships employing regular catcher vessels and tuna motherships carrying portable vessels. However, owners of small and medium vessels do not want to see present restrictions on numbers of portable vessels lifted since this would mean that large distant-water vessels would be able to increase production, and smaller vessels would likely suffer as a result of this increase in production. (Nippon Suisan Shimbun, April 7, 1961.)

\*\*\*\*\*

## BERING SEA BOTTOM FISHERY PLANS FOR 1961:

A large Japanese fishery company's fish-meal factoryships Kinyo Maru (9,373 gross tons) and Renshin Maru (14,094 gross tons) were scheduled to depart from Hakodate on May 10-11, 1961, for the bottom fishing grounds in the Bering Sea. These two vessels hope to produce a combined total of 30,000 metric tons of fish meal and over 4,500 metric tons of frozen fish this year. In 1960 Kinyo Maru and Renshin Maru produced a total of 29,000 metric tons of fish meal, 5,400 metric tons of fish solubles, and 4,500 metric tons of frozen fish.

The same fishery firm's mothership Shinyo Maru (5,630 gross tons), which was engaged in herring and king crab operations in Bristol Bay last year, was scheduled to depart for Bristol Bay on May 5. Catcher vessels assigned to that fleet were to leave port three days earlier.

The following vessels, belonging to several fishery firms--Soyo Maru (11,192 gross tons), Tenyo Maru (11,581 gross tons), and Eiyo Maru (2,482 gross tons); factoryships Gyokuei Maru (10,357 gross tons) and Itsukushima Maru (5,889 gross tons); mothership Seifu Maru (8,693 gross tons); and other fleets--were scheduled to depart for the Bering Sea fishing grounds in late April or early May.

The above-mentioned fleets are part of a vast Japanese fleet of dragners and long-line vessels planning to engage in the Bering Sea bottom fishery extending from 170° E. longitude eastwards to Bristol Bay. According to the Japanese Fishing Industry Weekly, 20 motherships (vessels over 3,000 gross tons) and 15 large independent dragners and long-liners, most of them well over 1,000 gross tons, hope to participate in the Bering Sea bottom fishery this year.

The Japanese Fishery Agency has set up an area licensing system according to gear (trawl, long-line, and sunken gill nets) and whether a vessel had previously engaged in the Bering Sea bottom fishery. From all indications, the fleets will be concentrated primarily in two general areas, Bristol Bay and the area between Cape Olyutorskii and Cape Navarin. Catch target for the Japanese fleets is 61,000 metric tons of fish meal and 175,437 metric tons of frozen fish.

As far as bottom fishing operations in the area to the south of the Alaska Peninsula (east of 165° W. longitude and north of 53° N. latitude) are concerned, the Fishery Agency recently announced that commercial operations will not be permitted in that area although experimental fishing had been permitted in the past, due to the great likelihood of catching halibut, which is protected under the international North Pacific fisheries treaty involving Japan, Canada, and the United States. (Suisan Tsushin, March 14; Nippon Suisan Shimbun, March 6; Fishing Industry Weekly, February 24, 1961.)

\*\*\*\*\*

## BRISTOL BAY FISH MEAL FACTORYSHIP FISHERY TRENDS:

Three of Japan's largest fishery firms, which are sending a total of four fish meal factoryship fleets to the Bristol Bay area this year, plan to produce a total of 61,026 metric tons of fish meal in 1961. Production target for the one firm with two fleets (Kinyo Maru fleet and Renshin Maru fleet) is 30,000 tons of fish meal; the targets of the other two firms with one fleet each are: Soyo Maru fleet 18,176 tons; and Gyokuei Maru fleet 12,850 tons.

Of the total of 61,026 tons, 1,400 tons are to be exported, 10,000 tons utilized by the fishery companies, and about 50,000 tons sold on the Japanese domestic market. It is reported that of the 50,000 tons, animal-feed



Typical Japanese factoryship operating in the Bering Sea. This was accompanied by a fleet of 24 trawlers.

## Japan (Contd.):



Washing silt and mud from a deckload of fish on the main deck of a Japanese factoryship in the Bering Sea.

producers have already signed contracts to purchase 16,000 tons.

According to figures submitted to the fish meal factoryship companies by the Animal Feed Producers Association (which reportedly produces 70 percent of all animal feed produced in Japan), 108,597 metric tons of factoryship-produced fish meal can be used by the Association between May and December. Some sources claim that this figure is exaggerated, but it is quite interesting to note that this amount far exceeds the total combined production target of the four fish meal factoryships.

The fish meal factoryship Kinyo Maru, 9,373 gross tons, departed for Bristol Bay on April 11. Renshin Maru, 14,094 gross tons, was to have left for Bristol Bay on the same day but her departure was delayed due to mechanical difficulties. (Suisan Keizai Shimbun, April 11 and 12, 1961.)

Production targets for the two large fishmeal factoryship fleets sent out by one firm are:

	Fish Meal	Fish Solubles	Frozen Fish
	(Metric Tons)		
<u>Renshin Maru</u> ..	16,000	4,500	6,000
<u>Kinyo Maru</u> ....	14,000	3,000	1,600

Note: Also each fleet is scheduled to produce some fish oil.

\*\*\*\*\*

## CRAB FISHING IN BRISTOL BAY:

For Japanese crab fishing in Bristol Bay off Alaska this year, the Fisheries Agency decided not to accept an application from a newcomer to participate in that fishery. Consequently, the Tokei Maru fleet jointly operated by three Japanese fishery firms and the Shinyo Maru operated by still another fishery firm are the only fleets fishing crabs in Bristol Bay this season--the

same as in 1960. (Suisan Tsushin, March 24, 1961.)

\*\*\*\*\*

## CANNED SARDINE PACKERS ANNOUNCE PRICES AND TARGETS FOR 1961:

The Japan Export Canned Sardine Fisheries Association announced sardine prices and export targets and outlets for 1961 at a special general meeting held on March 10. The 1961 pack quota was set at 1,005,000 cases.

Table 1 - Japanese Canned Sardine Prices, 1961/

Size of Can & Case	Price Per Case	Cases
In Tomato Sauce:		
No. 1, 48's (oval)	2,450 yen (US\$6.80)	330,000
No. 3, 96's (oval)	2,900 yen (US\$8.06)	250,000
5-oz. 100's	2,250 yen (US\$6.25)	140,000
No. 4, 48's	2,225 yen (US\$6.18)	16,000
Square No. 8	-	19,000
Natural:		
Quota shall depend on market conditions and will be determined later.		
1/Details given on only the pack of 755,000 cases.		

Table 2 - Japanese Export Targets and Destinations for Canned Sardines, 1961

Destination	Cases/
Philippine Islands	470,000
West Africa	125,000
Europe	89,000
Burma	16,000
Other countries	55,000
Total	755,000
1/Standard case--48 1-lb. cans; details given on export of only 755,000 cases.	

Consignments in 1960 totaled 423,906 cases and sales 448,688 cases; 1959 carryover was approximately 27,000 cases, leaving an unsold balance of approximately 2,000 cases. (Nippon Suisan Shimbun, March 13, 1961.)

\*\*\*\*\*

## SARDINE FISHING IN ONE AREA REPORTED GOOD:

At Onahama and Nakanosaku in Fukushima Prefecture, Japan, on the Pacific, some 500 tons of sardines were being landed every day in February. The season began in November 1960 and by February some 12,000 metric tons had been landed, valued at US\$1,083,333 ex-vessel, highest postwar record. The quantity was nine times as much as in 1955 when 125 tons of sardines and 1,297 tons of anchovies were landed and more than three times as much as in 1960 for the same period.

About 40 pairs of sardine purse seiners were operating, of which only three pairs belonged to Fukushima Prefecture leaving more

## Japan (Contd.):

than \$833,333 for vessels coming from Aomori, Iwate, Miyagi, and Ibaragi Prefectures. The fishing ground was off the coast of Fukushima Prefecture and good fishing was expected to continue until the beginning of March. (*Fisheries Economics News*, March 10, 1961.)

\* \* \* \* \*

## SARDINE FISHING GOOD IN SEVERAL AREAS:

At Choshi, Chiba Prefecture, on the Pacific coast of Japan, some 1,500 metric tons of pilchard, worth about US\$111,111, were landed during five days in the first part of March 1961. This is considered to be an unusual occurrence in view of light landings in that area the past six years.

According to leaders of the local fisheries cooperative, the large-size sardines that had been moving northward for spawning from Kyushu waters were held back by a mass of cold water off Shizuoka, Kanagawa Prefecture the past few years. For this reason sardines have not been seen off Choshi for six years, but they have been caught off the Sanriku area.

The schools of sardines off Choshi this year came from the Goto area (off Nagasaki Prefecture) through the Sea of Japan and the Tsugaru Strait, arriving at waters off the Sanriku area where the Kurile and Black Currents meet, and the schools were carried southward to waters off Choshi, about 20 kilometers off the coast. (*Fisheries Economic News*, March 28, 1961.)

As of late March, fairly heavy landings of sardines were reported along the Pacific coast centered around Onahama in the Tohoku area since March 10, and local fishermen were encouraged because the area has not seen any significant sardine landings since World War II.

The sardine packers in the Choshi, Chiba Prefecture, area started production with fish from Onahama. Output amounted to some 20,000 cases in ten days--70 percent for domestic consumption and 30 percent for export. (*Suisan Tsushin*, March 24, 1961.)

\* \* \* \* \*

## SECOND SALE OF CANNED SALMON TO GREAT BRITAIN:

In mid-March 1961, the Japanese Canned Salmon Sales Company started the second sale of some 190,000 cases (flat No. 2 7 $\frac{3}{4}$ -oz. cans) of canned red salmon for export to Great Britain, of which some 90,000 cases were sold early in March. Since about 50,000 cases were expected to be contracted, a total sale of 150,000 cases was considered to be certain. (*Suisan Tsushin*, March 20, 1961.)

\* \* \* \* \*

## CANNED MACKEREL PACKERS ANNOUNCE PRICES AND TARGETS FOR 1961:

The Japan Export Canned Jack Mackerel Fisheries Association announced prices and export targets and outlets for 1961 at a special general meeting held on March 8, 1961, for the first 450,000 cases of canned jack mackerel. The total pack quota for the year is 800,000 cases. (*Nippon Suisan Shimbun*, March 10, 1961.)

Table 1 - Japanese Canned Jack Mackerel, Type of Pack and Prices for First 450,000 Cases Canned

Size of Can and Case	Price per Case	Cases <sup>1/</sup>
<b>Tomato Sauce Pack:</b>		
No. 1, 48's (oval)	2,100 yen (US\$5.83)	90,000
No. 3, 96's (oval)	2,350 yen (US\$6.53)	55,000
5-oz. 100's	1,950 yen (US\$5.42)	60,000
No. 5, 48's	1,950 yen (US\$5.42)	10,000
<b>Natural Pack:</b>		
5-oz. 100's	1,800 yen (US\$5.00)	95,000
No. 4, 48's	1,800 yen (US\$5.00)	140,000
Total . . . . .		450,000
<sup>1/</sup> Standard case--48 1-lb. cans.		

Table 2 - Japanese Export Targets and Destinations for First 450,000 Cases of Canned Jack Mackerel, 1961

Destination	Tomato Sauce	Natural
	. . . . . (Std. Cases <sup>1/</sup> ) . . . . .	
Egypt . . . . .	-	80,000
West Africa . . . . .	50,000	-
Malaya-Singapore . . . . .	80,000	-
New Guinea . . . . .	20,000	45,000
Ceylon . . . . .	-	90,000
Indonesia . . . . .	10,000	-
Borneo . . . . .	10,000	-
Thailand . . . . .	20,000	-
Hong Kong . . . . .	10,000	-
Other countries . . . . .	15,000	20,000
Total . . . . .	215,000	235,000
<sup>1/</sup> Standard case--48 1-lb. cans.		

\* \* \* \* \*

## FISHERY AGENCY PROPOSAL TO STABILIZE FISH MEAL MARKET:

The Japanese Fishery Agency early this year made public a proposal, "Outline of Measures to Stabilize the Supply, Demand and Prices of Fish Meal for Animal Feed." The gist of the proposal is:

## Japan (Contd.):

Livestock Bureau chief shall annually (in March-April) draw up estimates on demand and supply of fish meal, with data on supply to be provided by the Fishery Agency. When fish-meal producers and users meet to negotiate prices, Livestock Bureau chief and Fishery Agency director shall provide necessary guidance to promote smooth settlement.

Price range of fish meal shall be fixed. Upper limit shall be 56,000 yen (US\$155.56) a metric ton for top-grade saury meal, rail delivery Kanto (Tokyo and surrounding area); lower limit 46,000 yen (\$127.78) a metric ton, delivery at production plant. Both Government agencies shall promote and encourage the sale of domestic fish meal within the framework of the above prices. Should domestic fish-meal prices exceed the established upper price limit for a period of over a month, then the Livestock Bureau, after consulting with Fishery Agency, shall determine the amount of foreign meal to be imported, as well as fix the time and means of importing foreign meal. However, imported foreign meal must not be sold for less than the lower price limit of domestic fish meal.

Differences realized from the sale of imported foreign meal shall be utilized to stabilize prices, production, supply, and demand, or allotted for studies on improving fish-meal quality. Livestock Bureau chief shall determine the final disposition of the funds but shall consult the Fishery Agency director.

Fishery Agency's proposal also covers exports of Japanese fish meal. The proposal states that Livestock Bureau chief shall consult the director of the Fishery Agency and draft necessary export regulations, giving careful consideration to over-all market conditions. Export price shall be based on the price of foreign fish meal imports--49,000 yen (\$136.11) a metric ton for fish meal with protein content of over 60 percent, delivery at Japanese port--to which other charges may be added, such as dock storage and handling fees, depending on arrangements.

Concerning the proposal, the Fishery Agency contends that the Feed Supply Stabilization Committee composed of livestock and fishing industry representatives, as well as Government agencies, has not functioned smoothly; that the Agency seeks to promote the full development of the livestock industry and stabilize the fish-meal industry and that its proposal includes appropriate measures to achieve those objectives. (*Fishing Industry Weekly*, No. 303, March 5, 1961.)

\*\*\*\*\*

#### IMPORT OF ADDITIONAL 10,000 TONS OF PERUVIAN FISH MEAL:

The Japanese Ministry of International Trade and Industry announced early in March that a dollar allocation of \$1,050,000 had been made to import an additional 10,000 metric tons of Peruvian fish meal. Compared to the price of \$98.61 c.&f. per metric ton paid for the earlier purchase of 10,000 tons of Peruvian fish meal, price for this second purchase was expected to be about \$107 c.&f. per metric ton. (*Nippon Suisan Shimbun*, March 10, 1961.)

\*\*\*\*\*

#### FEED SUPPLY COMMITTEE RECOMMENDS IMPORT OF 32,000 TONS OF FISH MEAL:

The Animal Feed Supply Stabilization Committee in Japan in March 1961 reported to the Ministry of Agriculture and Forestry that it will be necessary to import 32,000 metric tons of fish meal in fiscal year 1961 (April 1, 1961, to March 31, 1962) to meet the Japanese demand. Plans call for importing 15,000 metric tons in April and 17,000 tons in May.

The decision of the committee is not final. The one member of the fishing industry who was asked to attend the committee's meeting boycotted it, and Japanese fish-meal producers are expected to strongly oppose the committee's decision. They contend that imports should be handled in the manner stipulated in the Fishery Agency's proposal, "Outline of Measures to Stabilize the Supply, Demand and Prices of Fish Meal for Animal Feed." (*Suisan Tsushin*, March 23, 1961.)

\*\*\*\*\*

#### FISH SAUSAGE AND FREEZING PLANTS COMPLETED:

One of the largest Japanese fishing companies has completed the construction of a three-story fish sausage-ham plant and a four-story cold-storage plant (capacity-4,000 metric tons), including a freezing plant capable of freezing 30 metric tons of fish in eight hours, at Kurihama. Facilities include a research laboratory and quarters for company personnel. Total construction cost was one billion yen (US\$2,777,777).

The new fish sausage-ham plant is capable of producing 600,000 pieces of fish sausage and hams. The Japanese plants, one in Sapporo, Hokkaido (daily capacity, 50,000 pieces); one in Ishinomaki, Miyagi Prefecture (daily capacity, 30,000 pieces); another in Hiroshima (daily capacity, 30,000 pieces); and that the daily productive capacity of all four of Nichiro's fish sausage plants now totals about 700,000 pieces. (*Suisan Tsushin* and *Shin Suisan Shimbun Sokuho*, March 23, 1961.)

\*\*\*\*\*

#### LARGE COMPANY SETS PROCESSED FISHERY PRODUCTS PRODUCTION TARGET:

The third largest fishing company in Japan has set its production target for fishery products in 1961.



## Japan (Contd.):

Product	Unit	1961 Production Target	1960	
			Pro- duction	Value US\$
<b>Canned:</b>				
Salmon	cases	492,728	517,726	20,843,830
Crab	"	139,170	141,786	3,532,322
Tuna	"	55,090	46,868	310,658
Saury- sardine	"	116,150	28,228	183,680
Fresh fish	metric tons	17,324	17,959	3,095,422
Frozen fish	"	28,591	20,701	5,394,694
Salted fish	"	5,702	3,832	2,298,567
Fish ham	cases	98,000	48,026	223,875
Fish sausage	"	1,422,850	338,164	3,022,764
Animal feed	metric tons	30,074		

According to the target, the company plans to increase fish sausage production fourfold, and 1961 sales are expected to reach 3,500,000,000 yen (US\$9,725,000). A fourfold increase in canned saury and sardine production is also planned. The target also specifies production of canned Mandarin oranges, fruit juice, ice, eggs, poultry, mink fur, and mayonnaise.

As of the present, the company owns 20 canneries, 15 cold-storage plants, four fish sausage-ham plants, three frozen food plants, one fruit juice plant, one combined plant producing mayonnaise, pan fryers (chicken), and animal feed, a mink farm, and 91 vessels totaling 59,843 tons. (*Shin Suisan Shimbun* *Sokuhp*, March 24; *Suisan Taushin*, March 10, 1961.)

\*\*\*\*\*

#### LARGE FISHERY FIRM PLANS TO INVEST OVER \$5 MILLION IN 1961:

A large Japanese fishery company plans to invest a total of two billion yen (US\$5,555,555) in 1961 for vessel and plant construction. The firm plans to build a 3,300-ton freezer vessel at a cost of 700 million yen (\$1,944,444); three tuna fishing vessels in the 400-ton class for 600 million yen (\$1,666,667); a fish sausage plant with a daily production capacity of 50,000 pieces; a cold-storage plant at Kesennuma in north-eastern Japan, where the company operates a two-line cannery; and a cannery at Shimizu, an important tuna port south of Tokyo. (*Nippon Suisan Shimbun*, March 6, 1961.)

\*\*\*\*\*

#### MARINE-OIL SUPPLY, FOREIGN TRADE, AND CONSUMPTION, 1959-1961:

Japan's production of edible marine oils declined in 1960 as compared with 1959, but this year production is expected to recover to an estimated 171,400 metric tons. Marine-oil production in Japan consists of cod-liver oil, shark-liver oil, fish oil, and whale oil. In 1961, whale oil is expected to account for 75 percent of the total production of 128,000 tons, followed by fish oil with 20 percent or 34,400 tons. Shark-

liver oil production is expected to amount to 3,000 tons in 1961, and cod-liver oil to 6,000 tons. In addition, production of inedible marine oils (all of which is sperm oil), amounted to 37,902 tons in 1959, dropped to 31,564 tons in 1960, and is expected to increase to 35,400 tons in 1961.

Imports of marine oils remain insignificant, but exports have been heavy and are expected to reach an all-time high of 111,000 tons in 1961 (tables 1 and 2).

Table 1 - Japan's Production, Foreign Trade, and Stocks of Edible Marine Oils, 1959-1961

Year	Production	Imports	Exports	Stocks on hand <sup>3</sup> January 1		
				Fish-Liver & Fish Oil	Whale Oil	Total
1961 <sup>1</sup>	171,400	1,000	111,000	8,265	1,476	9,741
1960	134,577	1,046	84,598	17,384	3,976	21,360
1959 <sup>2</sup>	156,594	1,545	84,572	9,293	5,728	15,021

<sup>1</sup>/Forecast.

<sup>2</sup>/Revised.

<sup>3</sup>/Held by oil mills and oil-processing plants.

Table 2 - Japan's Production of Edible Marine Oils by Types, 1959-1961

	1961 <sup>1</sup>	1960	1959 <sup>2</sup>
	(Metric Tons)		
Cod-liver oil <sup>3</sup>	6,000	5,700	6,618
Shark-liver oil <sup>3</sup>	3,000	2,800	3,222
Fish oil	34,400	20,000	37,887
Whale oil	128,000	106,077	108,867
Total	171,400	134,577	156,594

<sup>1</sup>/Forecast.

<sup>2</sup>/Revised.

<sup>3</sup>/Including medicinal oil.

Table 3 - Japan's Imports of Marine Oils by Country of Origin, 1959-1960

Commodity	Origin	1960	1959
		(Metric Tons)	
<b>Edible Oils:</b>			
Cod-liver oil:	United States	-	-
	Korean Rep.	149	60
	Hong Kong	6	36
	Rep. of China (Taiwan)	-	4
	Netherlands	3	-
	Total	158	100
Shark-liver oil:	United States	57	-
	Korean Rep.	89	23
	Hong Kong	3	4
	Rep. of China	91	115
	Norway	33	20
	France	3	-
	Argentina	-	10
	Total	276	172
Fish-liver oil:	United States	18	34
	Korean Rep.	123	232
	Ryukyu Islands	2	1
	Hong Kong	221	211
	Rep. of China	16	38
	Norway	-	5
	Denmark	-	-
	Portugal	1	1
	Total	381	522
Whale oil	Ryukyu Islands	233	751
Total Edible Oils		1,048	1,545
<b>Inedible Oil:</b>			
Sperm oil	Ryukyu Islands	127	172
Grand Total		1,175	1,717

## Japan (Contd.):

Commodity	Destination	1960 (Metric Tons)	1959 (Metric Tons)
<b>Edible Marine Oils:</b>			
<b>Cod-liver oil:</b>			
	United States	1,061	1,099
	Ryukyu Islands	1	-
	Hong Kong	6	2
	Thailand	4	4
	Malaya	0	1
	Singapore	2	7
	Norway	-	1
	Sweden	2	39
	United Kingdom	13	5
	Netherlands	-	4
	Belgium	-	30
	France	-	10
	Portugal	18	-
	Canada	9	45
	Mexico	36	114
	Colombia	-	7
	Brazil	2	-
	Others	0	0
	<b>Total . . . . .</b>	<b>1,154</b>	<b>1,368</b>
<b>Shark-liver oil:</b>			
	United States	1	1
	Thailand	14	13
	India	5	5
	Lebanon	2	2
	Norway	54	5
	Sweden	-	11
	United Kingdom	-	5
	Netherlands	20	1
	Belgium	21	35
	France	1	22
	Italy	2	-
	Canada	-	4
	Argentina	16	-
	<b>Total . . . . .</b>	<b>136</b>	<b>104</b>
<b>Fish-liver oil:</b>			
	United States	818	560
	Ryukyu Islands	2	2
	Hong Kong	1	-
	Rep. of China (Taiwan)	1	-
	Thailand	39	11
	Malaya	2	-
	Singapore	9	-
	Philippines	4	14
	Israel	3	-
	Lebanon	26	76
	Norway	407	56
	Sweden	36	27
	United Kingdom	120	159
	Netherlands	102	45
	Belgium	109	111
	France	212	184
	West Germany	0	1
	Portugal	2	-
	Italy	24	7
	Canada	18	39
	Mexico	7	38
	Colombia	-	1
	Honduras	2	-
	Brazil	2	-
	Peru	-	6
	Argentina	21	-
	South Africa	1	1
	Australia	26	-
	Others	-	0
	<b>Total . . . . .</b>	<b>1,994</b>	<b>1,328</b>
<b>Fish oil:</b>			
	United States	7	-
	Ryukyu Islands	1	-
	Republic of China	163	476
	Thailand	-	1
	Philippines	-	1
	Iran	-	4
	Guam	1	-
	<b>Total . . . . .</b>	<b>172</b>	<b>482</b>

Commodity	Destination	1960 (Metric Tons)	1959 (Metric Tons)
<b>Edible Marine Oils (Contd.):</b>			
<b>Whale oil:</b>			
	Republic of China	10	18
	United Kingdom	21,548	23,985
	Netherlands	30,849	43,644
	Belgium	4,794	8,281
	West Germany	23,943	4,899
	Czechoslovakia	-	453
	<b>Total . . . . .</b>	<b>81,144</b>	<b>81,280</b>
<b>Total edible marine oils . . . . .</b>		<b>84,600</b>	<b>84,572</b>
<b>Inedible Marine Oils:</b>			
<b>Sperm oil:</b>			
	United States	4	0
	Korean Republic	5	-
	Republic of China	65	57
	Philippines	16	10
	Sweden	5,083	-
	United Kingdom	3,733	-
	Netherlands	1,744	15,696
	Belgium	10,364	-
	West Germany	546	3,229
	<b>Total . . . . .</b>	<b>21,560</b>	<b>18,992</b>
<b>Grand Total . . . . .</b>		<b>106,160</b>	<b>103,564</b>

Japan's stocks of total marine oils at the beginning of each calendar year increased from 15,021 tons in 1959 to 21,360 tons in 1960, but declined sharply on January 1, 1961, to 9,741 tons. Fish oil and fish-liver oil stocks accounted for 76 percent of the total stocks on hand over the three-year period; whale oil made up the balance (table 1).

Japan imported a total of 1,717 metric tons of edible and inedible marine oils in 1959 and 1,175 tons in 1960. Cod-liver oil (the bulk of which came from the Korean Republic), shark-liver oil (mostly from the Republic of China or Taiwan), fish-liver oil (mainly from Hong Kong and the Korean Republic), and whale oil (from the Ryukyu Islands) comprised 90 percent of the total marine oils imported for both years. Sperm oil from the Ryukyu Islands, the only inedible marine oil imported, accounted for the remaining 10 percent (table 3).

In 1959 and 1960, Japan exported virtually the same amount of edible marine oils, 84,572 tons in 1959 and 84,600 tons in 1960. Sperm-

Item	Consumption			Exports	Total Used & Exported
	Margarine & Other Processed Foods	Non-Food Uses	Total		
(Metric Tons)					
Whale oil	17,120	2,100	19,220	108,600	127,820
Sperm oil	-	35,400	35,400	1/	35,400
Fish oil	27,590	11,300	38,890	2,900	41,790
Total . . .	44,710	48,800	93,510	1/111,500	205,010

1/ There evidently were some exports of sperm oil, but the amount was not shown.

1/There evidently were some exports of sperm oil, but the amount was not shown.

## Japan (Contd.):

oil exports, the only inedible marine oil imported, increased from 18,992 tons in 1959 to 21,560 tons in 1960. Total edible and inedible marine oil exports in 1960 were up 2.4 percent from 1959 (table 4).

Japan will use domestically 19,220 tons of whale oil in 1961 and export 108,600 tons. Sperm-oil use will amount to 35,400 tons with no exports. Fish-oil consumption should reach 38,890 tons, with some exports of 2,900 tons. (United States Embassy, Tokyo, April 14, 1961.)

Note: Also see Commercial Fisheries Review, January 1960 p. 74.

\* \* \* \* \*

TRADE AGENCY PLANS SECOND  
TRADE SHOW IN NEW YORK CITY:

The Japan Export Trade Promotion Agency announced in March that it will again put on a trade exhibit in New York this year. This exhibition, the second of its kind, will be held from October 1961 to March 1962. (Shin Suisan Shimbun Sokuho, March 28, 1961.)



## Mexico

ENSENADA FISHERY TRENDS,  
FIRST QUARTER 1961:

Landings of spiny lobsters in the Ensenada area of northwest Mexico this season, which ended March 16, 1961, will probably surpass last year's by a slight margin. Spiny lobster landings in January and February were about 464,000 pounds. The season's total as of February 25, 1961, was 1,230,000 pounds, a little better than last year's total at that date.

Landings of sardines at Ensenada in January and February amounted to about 5.5 million pounds. Landings from the waters off Ensenada actually have been poor. The success of this year's fishing is attributed to the landings by larger boats which ranged down the peninsula coast as far as Punta San Juanico, some 500 miles south of Ensenada off the Territory of Baja California.

The abalone season opened on March 15. (United States Consulate in Tijuana, April 3, 1961.)

\* \* \* \* \*

MERIDA FISHERY TRENDS,  
FIRST QUARTER 1961:

Landings of shrimp for the first quarter of 1961 in the Carmen-Campeche area of Mexico were normal for the time of year, the light landings being more the result of bad weather than the lack of shrimp. As sizes were larger than normal for the season, it is believed that inactivity during part of 1960 prevented the usual large catches of small shrimp and that the stocks are now in good shape. Prices changed very little from the latter part of 1960. Customer resistance, high inventories, economic conditions, and the hard winter in the United States combined to keep prices at the lower levels.

Yucatan's principal fish product has run into trouble in the United States. It is known locally as mero or grouper and has been sold in the United States packaged under the label of "snapper." Reportedly, the U. S. Food and Drug Administration (FDA) claims the practice is misrepresentation. The Mexican shippers claim the mero is a gray snapper, one of the varieties of snapper. The Mexican industry is awaiting a decision by the FDA regarding the name which may be used for the product. The product has been selling freely in Florida, but its sale is prohibited in Louisiana by State law. (United States Consulate, Merida, April 8, 1961.)

\* \* \* \* \*

## SHRIMP FISHERY TRENDS, APRIL 1961:

During April this year, Mexican west coast shrimp landings at Guaymas and Salina Cruz were reported to be declining, while landings in the Mazatlan area were holding up fairly well. In the Gulf of Mexico area, Tampico landings were reported to be low, as they have been all season. High winds were bothering the Carmen-Campeche shrimp vessels with March landings averaging about 1,000 pounds of heads-off shrimp per trip.

Campeche landings during March this year were about 90 percent pink and 10 percent white. At Carmen they were about 40 percent each white and brown and about 20 percent pink.

Sizes at Campeche were about 80 percent under 30 count per pound for the first half of March and then sizes began to decrease until by the end of the month less than 60 percent of the landings were 30 count and under.

## Mexico (Contd.):

Mexican Shrimp Ex-Vessel Prices on April 7, 1961, at Carmen and Campeche and Salina Cruz			
	Carmen & Campeche All Species	Salina Cruz	
		Brown	White
	.....(U. S. Cents a Pound).....		
10-14 . . . . .	54	-	-
Under 15 . . . .	-	43	45
15-20 . . . . .	52	40	42
21-25 . . . . .	48	35	37
26-30 . . . . .	43	32	32
31-35 . . . . .	38	-	-
36-40 . . . . .	-	24	24
41-50 . . . . .	33	-	-
51-50 . . . . .	28	20	20
51 and over . . .	-	15	15
51-65 . . . . .	23	-	-
66 and over . . .	18	-	-

Carmen shrimp sizes were fairly uniform--about half 30 and under and half 31 and over per pound.

At Carmen and Campeche ex-vessel prices on April 7, 1961, were one to two cents a pound less than on March 1, 1961. (United States Embassy, Mexico, D. F., April 21, 1961.)

\*\*\*\*\*

#### EXPORT DUTIES REVISED FOR SOME FISHERY PRODUCTS:

On March 28, 1961 (published in Diario Oficial, March 27, 1961) the Mexican Government made some slight changes in export duties by lowering those on fresh, iced, or frozen albacore and red snapper and increasing those on fresh, iced, or frozen catfish, stone and other walking crabs. The export duty was decreased on albacore about  $\frac{1}{10}$  of a U. S. cent a pound and on red snapper about  $\frac{1}{5}$  of a cent. The duty on catfish was raised about  $\frac{1}{100}$  of a cent a pound and those on stone and other walking crabs about  $\frac{25}{100}$  of a cent a pound. These changes were effected by changes in the official price on which ad valorem duties are based.

Current Mexico export duties, in U. S. cents a pound, are now about: fresh, iced, or frozen albacore 0.46; fresh, iced, or frozen catfish 1.22; fresh, iced, or frozen stone crabs 1.29; fresh, iced, or frozen walking crabs 1.29; and fresh, iced, or frozen snappers 0.75.

It is not anticipated that the changes in duties will have any effect on exports of these products to the United States. For the past several years, owing to ocean temperatures, albacore have not appeared in any

quantity off the Mexican west coast. The crabs have never been an item of great export importance. About 500,000 pounds of catfish and 250,000 pounds of red snapper were exported to the United States in 1959. (United States Embassy, Mexico, D.F., March 28, 1961.)

\*\*\*\*\*

#### EXPERIMENTAL FISHING WITH GILL NETS FOR SPANISH MACKEREL:

The Mexican Small Business Bank of the Federal District (Banco del Pequeno Comercio del Distrito Federal) is financing an experimental fishing project for Spanish mackerel in the Gulf of Mexico. The Four Lads, a small mackerel gill-netter from Apalachicola, Fla., arrived in Veracruz in March 1961 and was expected to begin fishing immediately. The project is reported to be a 90-day survey to determine whether Spanish mackerel can be caught successfully along the Mexican coast with gill nets.

The traditional method of catching Spanish mackerel along the Veracruz coast is with beach seines set from row boats or powered skiffs. This method, of course, limits operations to a narrow belt immediately adjacent to the beach. Gill nets, if successful, would extend the fishing area considerably.

Spanish mackerel is a popular medium- to low-priced fish in Mexico. Increased production of this species should help provide fish for local use in a country where the per capita consumption is less than two pounds (probably landed weight) a year. (United States Embassy, Mexico, D.F., March 28, 1961.)



#### New Guinea

##### EXPERT CLAIMS GOOD POTENTIAL FOR SHRIMP FISHERY:

Shrimp from New Guinea could meet the challenge of cheap imports from Asia and provide new outlets for Australian investment. This is the opinion of an experienced fisherman and now a fish wholesaler and exporter of South Brisbane, Australia. The former fisherman was commissioned by the Australian Department of Territories to conduct a survey of fisheries resources in southern New Guinea waters.

He said, "In my opinion, there is a terrific potential for shrimp in the area. I am con-



### New Guinea (Contd.):

vinced that with its low labour costs, New Guinea could easily compete with shrimp imports from China and other cheap production countries. The waters of southern New Guinea--particularly toward Orangerie Bay and Mullins Harbour, are capable of large-scale exploitation. However, a capital outlay of about £100,000 (US\$223,800) would be needed to establish the industry.

The Australian fisherman went to New Guinea as master of the Fisheries Research vessel Tagula. After fitting up the vessel for shrimp fishing, he made several surveys during his six months' appointment. He found: (1) a large variety of shrimp, chiefly king, greasy backs, banana, and tiger, but no school shrimp; (2) a big bed of scallops about 60 miles northwest of Port Moresby; (3) plenty of spiny lobsters off Yule Island; (4) large quantities of shrimp existed in the Daru area (Gulf of Papua); (5) a prolific fishing ground, chiefly for barramundi, along a 60-mile stretch of sunken reef in the Louisiade Archipelago; and (6) big numbers of dugong (sea cows) from which is extracted oil for the watchmaking and instrument trade.

He said the survey proved that the painted spiny lobster is a vegetarian and cannot be caught in traps. Catching will probably be restricted to hand capture--as at present.

There is a possibility that trawling could be used on the outside shallow edges of reefs or perhaps gill-netting. Shrimp were most prolific after the wet season.

The last month of the contract was spent in a mackerel survey along the Louisiade Archipelago. In the first six days, approximately 8,000 pounds of fish were caught, which showed the great potential development. (Fish Trades Review, February 1961.)



### Nicaragua

#### NEW FISHERIES LAW ESTABLISHED:

A new basic fishing law for Nicaragua was promulgated in Gaceta Decree No. 557 of February 7, 1961. The law is designed to regulate the entire industry, and it establishes the general, and in many cases, the specific, regulations under which the industry is to operate.

The Gulf of Mexico coast of Nicaragua has seen an upsurge of interest in commercial fishing for shellfish that has made some sort of regulatory measure necessary. With the exception of the regulations governing sea-turtle fishing, there are no particular conservation measures in this decree, but provision is made for the promulgation of them at some future date under the present structure. Considering that fishing is a relatively new industry in Nicaragua and has not as yet been completely explored, this seems the best procedure. Also, provision is made for future regulation of the Pacific Coast fishing grounds which are not used at present for large-scale fishing.

Taxes that are set up under the law fall principally upon the vessel owner as opposed to the processing plant, although in at least some cases it may be assumed that the ownership would be identical. The owner of the processing plant is, in fact, given considerably greater inducement for investment in the country than is the vessel owner. The present Director General of Natural Resources has stated that this is to insure the permanency of the investment in the fishing industry and to keep out the gypsy operator, as well as to improve the chances of continued employment for Nicaraguan nationals and to serve as a conservation measure.

The actual extent of Nicaraguan territorial waters is not delineated in the law, although in those sections dealing with sea-turtle fishing there are certain regulations that would extend Nicaraguan jurisdiction to 7 kilometers or 4.4 miles.

Under the terms of the law all existing commercial or exploratory licenses must be reaffirmed to conform to the requirements. As of March 3, 1961, only one renewed license has been published in the Official Register, and although it is expected that most of present companies will be reregistered, it is known that at least one company that has been operating in Nicaraguan waters for the past several years may have some difficulty in obtaining a permit under the new law. (United States Embassy, Managua, March 3, 1961.)



## Norway

### ANTARCTIC WHALING PRODUCTION UP IN 1960/61 SEASON:

According to press reports, the Norwegian Antarctic whaling expeditions produced a total of 665,883 barrels of whale oil from a catch of 5,194 blue-whale units during the 1960/61 season which ended April 7. The catch was substantially better than last season when only 4,568 blue-whale units were taken, but it was still considerably below the national quota of 5,800 units based on the actual catch in the 1958/59 Antarctic season. The Norwegian expeditions also produced 74,342 barrels of sperm oil this season, about 11,000 barrels more than in 1959/60. The total production, including byproducts, is valued at about 180 million kroner (US\$25.1 million), the United States Embassy in Oslo reported on April 14, 1961.

\*\*\*\*\*

### FISHING FIRM PLANS TO BUILD RESEARCH LABORATORY:

A fishing company plans to build a research laboratory in Kabelvag to study the Lofoten cod in cooperation with the Ocean Research Institute of Bergen. The cost of the laboratory plus a research vessel will be about Kr. 1.9 million (US\$266,000)--News of Norway, March 30, 1961.

\*\*\*\*\*

### FISHING LIMITS EXTENDED:

According to a Government decision announced March 24 the Norwegian fishery zone will be extended from 4 to 6 nautical miles on April 1 and from 6 to 12 miles on Sept. 1, 1961. Norwegian trawlers up to 300 gross tons will until further notice be permitted to fish in the zone between 4 and 6 miles. Vessels of more than 300 tons may trawl in this zone until October 1, 1961. Regulations banning holiday fishing will not be affected.

The two-stage extension was approved by the Norwegian Parliament. The controversial question of trawling rights between the 4 and 6 mile limits was the subject of a 7-hour debate. A large majority, which included Representatives of all parties, supported a compromise proposal recommended by the Foreign Affairs Committee and subsequently adopted by the Government.

One of the two rejected minority proposals urged that all trawling inside the 6-mile

limit be banned from July 1, 1961, as demanded by fishermen in North Norway. The other, also turned down, proposed that trawlers above 300 gross tons should be granted unrestricted fishing rights in the 4-6 mile zone, as demanded by trawling and filleting companies. (News of Norway, March 30, 1961.)

Note: Also see Commercial Fisheries Review, May 1961 p. 56.

\*\*\*\*\*

### WINTER-SPRING HERRING FISHERY WORST IN MANY YEARS:

The winter-spring herring fishery off Norway's west coast that ended March 31, 1961, was the worst in a generation. The total catch of winter and spring herring was less than 72,000 metric tons, nearly 30,000 tons below the figure predicted by the most pessimistic fishery experts. The entire catch was not much larger than a good day's landings in one of the better herring years.

The failure is attributed to a combination of factors. Not only was there far less herring than in former years, but the weather was so stormy during most of the season that for days on end fishing vessels were forced to stay in port.

Yet, the economic consequences appear to be less serious than would have been the case only a few years ago. Main reason is that fishermen, prepared for failure, made cautious investments. (News of Norway, April 20, 1961.)

\*\*\*\*\*

### FISHERY LANDINGS, 1957-1960:

Norway's total landings of all fishery products amounted to 1.3 million metric tons valued at US\$89.9 million ex-vessel in 1960; 1.4 million tons valued at US\$93.4 million in 1959; 1.2 million tons valued at US\$81.4 million in 1958; and 1.6 million tons valued at US\$87.7 million in 1957. (See table 1.)



Lobster pots used by part-time Norwegian fisherman.

## Norway (Contd.):

Table 1 - Norway's Landings of Fishery Products by Principal Species Groups, 1959-1960

Item	1960			1959		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Kr. 1,000	US\$ 1,000		Kr. 1,000	US\$ 1,000
Herring and sprat (brisling) . . . . .	680,336	195,663	27,403	727,800	215,491	30,180
Cod and cod byproducts . . . . .	225,107	192,837	27,007	267,294	218,524	30,604
Others . . . . .	401,664	253,205	35,461	365,332	232,573	32,572
Total . . . . .	1,307,107	641,705	89,871	1,360,426	666,588	93,356

Note: Values converted at rate of one kroner equals US\$0.14005.

Herring and cod continued as the most important species landed, accounting for approximately two-thirds of the total landings. Sand eel (used principally for fish meal) land-

It is, however, important to note that fisheries others than the herring and cod fisheries have shown steady progress for years already. Interest and repayments of loans

Table 2 - Norway's Landings of Fishery Products, 1957-1960<sup>1/</sup>

Item	1960 <sup>1/</sup>			1959 <sup>1/</sup>			1958			1957		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value		Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Kr. 1,000	US\$ 1,000		Kr. 1,000	US\$ 1,000		Kr. 1,000	US\$ 1,000		Kr. 1,000	US\$ 1,000
Capelin . . . . .	92,785	10,399	1,458	78,987	8,812	1,234	91,680	7,341	1,027	70,022	8,644	964
Sea trout . . . . .	1,231	14,000	1,961	1,233	13,766	1,926	1,239	14,205	1,987	1,398	13,153	1,840
Halibut . . . . .	5,248	18,854	2,641	5,198	16,745	2,345	5,622	16,829	2,354	4,793	15,590	2,180
Halibut, Greenland . . . . .	6,367	4,441	622	4,307	3,034	425	2,931	1,911	267	4,130	2,459	344
Plaice . . . . .	1,164	2,099	294	1,163	1,783	250	1,155	1,818	254	1,189	1,758	246
Cusk . . . . .	20,121	15,975	2,237	15,478	11,074	1,551	15,939	10,745	1,503	11,225	6,773	947
Haddock . . . . .	35,645	25,803	3,614	37,510	26,945	3,774	41,578	25,404	3,553	41,841	23,118	3,233
Cod: Spawning . . . . .	75,024	67,403	9,440	89,826	75,576	10,584	70,589	59,313	8,296	59,497	43,648	6,105
Finmark . . . . .	39,479	30,278	4,240	52,484	41,503	5,812	69,299	50,689	7,091	52,143	36,032	5,038
Bank and Fjord . . . . .	35,545	37,125	5,200	37,342	34,073	4,772	1,289	8,924	1,205	7,354	5,416	767
Pollock . . . . .	1,842	1,711	240	2,265	2,037	285	2,506	2,163	303	2,486	1,859	260
Saithe . . . . .	76,274	42,241	5,916	80,698	42,521	5,955	66,472	35,176	4,920	75,864	35,690	4,992
Ling and blue ling . . . . .	13,304	14,860	2,081	13,948	14,209	1,990	10,932	9,118	1,275	9,816	7,545	1,055
Livers: Spawning and Finmark cod . . . . .	10,010	4,353	610	12,375	5,366	752	13,818	6,738	942	9,701	5,443	761
Roe: Spawning cod . . . . .	4,294	3,481	502	4,808	3,949	553	4,030	3,371	471	3,509	2,868	401
Herring: . . . . .	300,143	89,684	12,566	416,360	115,280	16,148	345,294	88,078	11,312	785,582	183,067	25,603
Winter . . . . .	61,162	16,119	2,257	45,490	12,340	1,728	53,860	13,540	1,894	45,306	10,565	1,478
Small . . . . .	215,260	35,709	5,001	179,916	30,342	4,249	146,103	27,175	3,801	129,624	23,356	3,267
Fjord . . . . .	2,105	1,618	227	1,423	1,035	145	1,239	926	130	1,141	834	117
Trawl . . . . .	15,999	5,537	775	16,938	5,944	832	8,187	2,688	376	7,651	2,396	335
Iceland . . . . .	77,464	35,941	5,034	56,536	33,622	4,709	52,904	32,318	4,520	30,962	23,959	3,351
Sprat or brisling . . . . .	8,203	11,055	1,548	11,137	16,928	2,371	5,617	8,103	1,133	9,524	13,461	1,883
Mackerel and young mackerel . . . . .	19,733	12,298	1,728	17,596	11,541	1,616	14,591	9,573	1,339	11,617	7,352	1,028
Tuna . . . . .	3,267	5,771	808	2,522	4,394	606	4,307	6,002	840	5,009	8,186	1,145
Sand eel . . . . .	13,651	3,097	434	7,866	1,988	278	4,817	1,110	155	3,230	721	101
Ocean perch . . . . .	6,637	3,930	550	3,976	2,702	378	4,212	2,584	361	4,040	2,641	369
Wolfish . . . . .	2,743	1,192	167	3,304	1,578	221	2,801	1,252	175	2,576	1,083	151
Dogfish . . . . .	25,594	10,958	1,535	19,108	7,492	1,049	22,412	8,143	1,139	18,704	7,236	1,012
Crab . . . . .	3,485	2,104	295	3,636	2,387	334	3,920	2,341	327	3,138	1,951	273
Lobster . . . . .	680	8,783	1,230	683	7,755	1,086	714	7,170	1,003	655	6,870	944
Prawn, deep-water . . . . .	9,496	29,423	4,121	9,706	4,343	606	7,270	22,575	3,157	7,071	20,757	2,820
Squid . . . . .	100	50	7	1,795	665	93	9,618	2,404	336	73	34	5
Livers, other . . . . .	13,812	5,800	812	14,295	6,349	889	15,090	6,788	949	15,237	9,149	1,280
Roe, other . . . . .	613	878	123	519	137	19	1,210	886	124	1,193	739	103
Seaweed, dried . . . . .	13,000	2,300	322	12,117	2,144	300	15,591	2,363	330	10,018	1,903	266
Others . . . . .	34,893	17,228	2,413	27,442	13,501	1,891	5,829	8,121	1,136	6,108	8,221	1,150
Total . . . . .	1,307,107	641,705	89,871	1,360,426	666,588	93,356	1,236,851	582,275	81,437	1,573,892	626,751	87,657

<sup>1/</sup> 1960 preliminary.<sup>2/</sup> 1959 revised.

Note: Values converted at following rates: 1957-1960: one kroner equals US\$0.14005; 1957-1958: one kroner equals US\$0.13787.

ings steadily increased over this 4-year period, but tuna landings remained relatively insignificant and leveled off near 3,000 tons per year. (Fiskets Gang, December 1960.)

The decline in the Norwegian fisheries since 1956, when nearly 2 million tons were landed, may be ascribed to the failing winter herring fishery which in 1960 yielded only a little more than one fourth of the catch in the record-breaking year of 1956. The total catch of cod, including byproducts, was some 42,000 tons smaller than in 1959.

and advances made by the State Fishery Bank to owners of fishing vessels were paid more readily in 1960 than in 1959. The fishermen have been able to find a way out of their difficulties. Some had good fishing in the Iceland fishery and distant-water fishing also proved profitable.

The loans granted by the State Fishery Bank at present amount to about 230 million kroner (US\$32.2 million). For the year of 1961 the Government presupposes normal loans from the Bank totaling 34 million

## Norway (Contd.):

kroner (\$4.8 million) for new construction and modernization of old vessels and another 20 million kroner (\$2.8 million) for modern trawlers.

Even if comparatively few new fishing vessels were built last year for Norwegian owners--quite a number were constructed for Iceland and the Faroe Islands by Norwegian shipbuilding yards--a feature of the situation is the interest in Norway in factory trawlers and stern-trawlers. Norway's first factory trawler has successfully started fishing operations; a couple of small vessels of the stern-trawler type were built in 1960, and in March 1961 the first big stern trawler, built for a fishing company in Northern Norway, was scheduled to be delivered. A few more stern trawlers are going to be built at Norwegian and foreign yards. (*Norwegian Fishing News*, No. 4, Vol. 7, 1960.)



## Peru

# EXPORTS OF MARINE PRODUCTS, FOURTH QUARTER 1960 AND YEARS 1959-60:

Exports of principal marine products by Peru in 1960 amounted to 603,995 metric tons (valued at US\$53.0 million). Fish meal exports (507,042 tons) for 1960 were up about 32.7 percent from the 277,600 tons exported in 1959. The average export value of fish meal per metric ton in 1960 was only \$76.32 as compared with \$111.10 in 1959. Exports

of fish oil increased sharply (104 percent) in 1960, but the exports of frozen and canned fish dropped from 43,734 tons in 1959 to 33,897 tons in 1960. (United States Embassy in Lima, April 12, 1961.)

\*\*\*\*\*

## FRENCH EXPERT STUDIES SITE FOR NEW FISHING PORT:

A representative of a French enterprise (Societe Grenobloise D'Etudes et D'Applications Hydrauliques), under a 90-day contract with the Peruvian Ministry of Development, has begun a search for a site for the location of a new fishing port. The objective is to remove the problem of air pollution from the urban areas of Lima and Callao by relocating approximately 35 fish meal plants. This is one of the proposals being considered by the industry committee appointed by the Government to find a solution to this problem.

Many reduction plants have installed deodorizing equipment or have taken other measures to reduce or avoid the troublesome odors that sometimes invade the two cities and suburban areas under certain atmospheric conditions, and it is believed that considerable success has been achieved. This method appears to offer the most feasible permanent solution to the problem of odors. (United States Embassy, Lima, April 12, 1961.)



Peruvian Exports of Principal Marine Products, October-December 1960 and Years 1959-60

Marine Products	Oct.-Dec. 1960			Year 1960			Year 1959		
	Qty.		Value 1/	Qty.		Value 2/	Qty.		Value 3/
	Metric Tons	Million Soles	US\$ 1,000	Metric Tons	Million Soles	US\$ 1,000	Metric Tons	Million Soles	US\$ 1,000
Fish meal .....	123,442	206.2	7,680	507,042	1,056.4	38,696	277,600	860.5	30,842
Fish (frozen, canned, etc.) . . .	9,035	54.6	2,036	33,897	210.2	7,700	43,734	266.6	9,556
Fish oil .....	11,280	31.3	1,147	35,008	99.2	3,634	17,165	47.7	1,602
Sperm oil .....	4,011	13.9	518	13,500	46.3	1,696	10,004	33.9	1,215
Fertilizer (guano) .....	1,834	4.4	164	11,765	28.9	1,059	11,767	28.3	1,014
Whale meal .....	1,940	2.1	78	2,783	4.7	172	3,917	9.7	348
Total .....	150,832	312.5	11,623	603,995	1,445.7	52,957	364,187	1,246.7	44,577

1/F.o.b. values, converted at rate of 26.85 soles equal US\$1 for fourth quarter of 1960.

2/F.o.b. values, converted at rate of 27.30 soles equal US\$1 for 1960.

3/F.o.b. values, converted at rate of 27.90 soles equal US\$1 for 1959.



## Philippines

### TRADING COMPANY OPENS BIDS FOR CANNED SARDINES:

On March 14, 1961, the Philippine trading organization (NAMARCO) held its quarterly bid opening for 165,000 cases of sardines, with 12 firms tendering offers. As trade sources predicted, no foreign suppliers or indentors offered Japanese sardines, and 11 of the bidders offered South African fish.

United States interests were represented in the following way:

- (1) Only one firm offered United States sardines (probably Maine sardines). The price, however, over US\$10 a case, was \$3 higher than most South African tenders.
- (2) Three Philippine indentors submitted bids from United States firms to supply South African sardines.
- (3) Three local subsidiaries of United States firms participated in the bidding, also offering South African products.

It appears, therefore, the United States interests will get at least a share of the latest NAMARCO sardine business, although probably no United States brand sardines will be supplied due to lack of stocks from the 1960 pack. (United States Embassy, Manila, March 21, 1961.)



## Ryukyu Islands

### JAPANESE FISHING COMPANY ESTABLISHES JOINT FISHERY COMPANY IN OKINAWA:

A large Japanese fishing company and a Ryukyu whaling company have invested US\$200,000 each in a joint fishery company in Okinawa. This new firm has three whaling vessels and one 350-ton tuna vessel.

The new company expects to catch 140 humpback whales and produce 500 metric tons of tuna a year. The tuna is to be utilized for the production of fish sausages and hams, and plans call for building a plant in the Ryukyus capable of producing 15,000 pieces of fish sausages a day.

Annual consumption of fish sausages in Okinawa totals about four million pieces, of

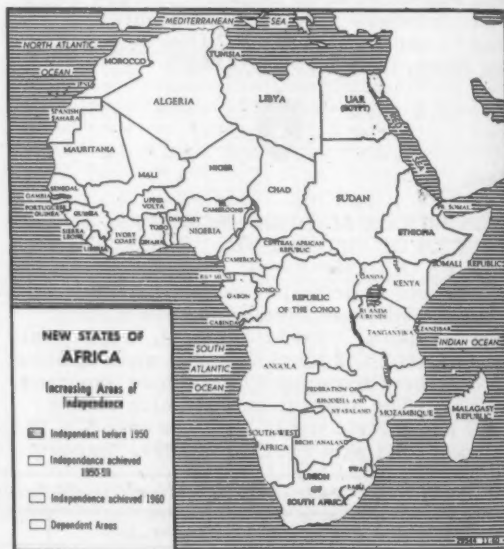
which 90 percent is supplied by the large Japanese fishing company's Shimonoseki plant in southern Japan. The proposed new fish sausage plant, upon its completion, is expected to replace this source of supply. (Nippon Suisan Shimbun, March 27, 1961.)



## South-West Africa

### SPINY LOBSTER LANDINGS BEST IN SEVEN YEARS:

Spiny or rock lobster processing plants in South-West Africa's port of Luderitz were reported working overtime in March this year to keep up with the biggest spiny lobster catch in seven years. The success of the spiny lob-



ster season is greatly dependent on favorable weather for boat operations; weather conditions this season have been nearly perfect so far. Up to mid-March, the factories at Luderitz had processed 30,000 units of spiny lobster tails (units of 20 pounds), of which three-quarters had been frozen for export to the United States and the rest canned, chiefly for the United Kingdom and Continental markets. (United States Embassy, Pretoria, March 23, 1961.)



## Sweden

### DATE OF INTERNATIONAL FISHERIES FAIR CHANGED:

The date of the Swedish International Fisheries Fair in Goteborg, which was originally announced as November 9-19, 1961, has been changed to November 2-12.

The exposition will cover a wide range of subjects connected with the fishing industry. Among the items to be displayed are boats, machines, electrical equipment for boats, fishing equipment, processing machines, transport apparatus, work clothes, etc.

The Fair will embrace approximately 10,000 square meters of display space. A total of 5,000 invitations to participate in the Fair have been sent to fishing organizations, companies, etc. both in Sweden and abroad.

Although the exhibition is primarily concerned with commercial fishing, sport fishing is to be included. It is hoped that the Fair will serve to bring about better understanding between sport and commercial fishermen. (United States Consulate, Goteborg, April 18, 1961.)



## Togo

### FISHING INDUSTRY:

Fishing is an important yet primitive industry in Togo. Salt-water fishing is done by canoes or pirogues which carry about seven men. The catch primarily consists of small sardine-size fish which are dried--most larger fish are salted or smoked. Salt-water fish are of little importance in the interior due to the lack of storage and transportation facilities. Some shrimp and spiny lobsters are also caught. One trawler presently operates from Lome, but a port must be constructed before Togo's fishing industry can develop.

Some fresh-water fishing is done in Lake Togo, the Oti, Mono, and Kara rivers and in stocked basins. (United States Embassy, Lome, November 14, 1960.)



## Tonga Islands

### ATTEMPT TO ESTABLISH A TUNA FISHERY RESUMED:

Over the period 1958-59, the Government of the Tonga Islands (a group of islands south of American Samoa) employed a New Zealand-built fishing vessel for training purposes in long-line tuna fishing techniques. During 1958 the vessel caught 187,731 pounds of fish of which 29.2 percent were tuna, and in 1959 caught 117,432 pounds of which 29.6 percent were also tuna. Based on these results, it was decided to proceed with the ordering of a vessel specifically designed for long-line tuna fishing and the *Teiko* was obtained from Japan. This ship was lost with all hands on her maiden voyage from Nuku'alofa in March 1960, and this loss was difficult to overcome.

A Japanese expert was subsequently engaged from Japan as Senior Fisheries Officer and arrived in the Kingdom with his family in September 1960. It was necessary to start from scratch in training a new crew in long-line methods. Also, as a considerable quantity of fishing equipment had been transferred from the New Zealand vessel to the *Teiko*, new lines and rigging had to be obtained. The first training voyage was made in early November 1960, and a total of 14 trips had been made up to the end of January 1961, with the following results as regards catches: tuna, 6,120 pounds; marlin, 10,802 pounds; shark, 12,014 pounds; and 498 pounds of miscellaneous species.

In November and December 1960, the average percentage of shark caught was 41 percent as compared to 49.5 percent and 48.8 percent in 1958 and 1959 operations, respectively. In January 1961, the average percentage of shark caught in 4 trips had dropped to 32 percent. These figures give grounds for cautious optimism as the percentage of shark caught in long-line operations is a problem in this type of fishing. It is understood that Japanese fishing concerns will tolerate up to an average shark catch of 62 percent on extended operations. Certain species of shark liver have reasonable commercial value, but the meat is not as good as that of tuna and other fish. All fish landings are made at Nuku'alofa where tuna and other species (except shark) retail for about one Tongan shilling (11.2 U. S. cents) a pound dressed weight. Shark meat sells for about 4 U. S. cents a pound. The question of what form further developments in the establishment of a commer-

## Tonga Islands (Contd.):

cial fishing industry will take is at present under consideration. (United States Consulate of Suva, Fiji Islands, March 29, 1961.)



## Union of South Africa

1961 PILCHARD SEASON  
OFF TO GOOD START:

With an expected total of more than 80,000 short tons, the Union of South Africa Cape west coast pelagic shoal fishery started the 1961 pilchard season with a record catch for any January period in the history of the industry. The January 1961 catch was also one of the highest ever landed in any one month of fishing.

After a rather disappointing experiment in the last two months of 1960 when boats went out for maasbanker or jack mackerel and mackerel only and caught less than 30,000 tons, the 1961 season got off to a remarkable start early in the year.

The previous three seasons were good ones for the industry, but the best previous January catch was below 35,000 tons.

This season the boats moved out and found their fish in packed shoals back where they were found some five or six years ago--in the St. Helena Bay area within a short distance of west coast factories. Later in the month, good catches were also made in the False Bay area.

With fish readily available within short distances of factory docks, boats came in with deckload after deckload. Several St. Helena Bay and Saldanha factories had a record or near record monthly intake. Fish were fat, mainly pilchards yielding about 20 gallons of body oil to a ton. The short hauls with good fish also proved good for canning.

With the decision last year to permit fishing for maasbanker and mackerel in November and December, the Cape west coast pelagic shoal-fishing season now extends from the beginning of November to the end of July.

The total catch to the end of December was 28,243 short tons, made up of 23,551 tons of maasbanker and 4,692 tons of mackerel.

In November the maasbanker catch was 8,674 tons and the mackerel catch 2,769 tons for a total of 11,443 tons. This catch yielded 1,682 tons of fish meal, 57,545 gallons of fish-body oil, 1,950,336 pounds of canned maasbanker, and 514,392 pounds of canned mackerel.

In December the maasbanker catch was 14,877 tons and the mackerel catch 1,923 tons for a total of 16,800 tons. This catch yielded 3,312 tons of fish meal, 136,341 gallons of fish-body oil, 2,294,688 pounds of canned maasbanker, and 710,304 pounds of canned mackerel. (The South African Shipping News and Fishing Industry Review, February 1961.)



## U. S. S. R.

FACTORYSHIP STERN-TRAWLERS  
FOR FISHING IN TROPICS:

The first of a series of stern-trawling factoryships designed for fishing in tropical waters is being constructed in East Germany.

Tropik I is specially built for fishing in central and south Atlantic waters. It can carry fuel and supplies for a 60-day trip, and it is expected that it will land 5,100 to 5,800 metric tons of processed fish and fish products annually. The vessel is 260 feet long and its two main motors are 670 hp. Diesels.

The crew of 76 will be housed in state-rooms, all with hot and cold water. All living and working quarters will be air conditioned.

Tropik I differs from other factoryship trawlers in that it does not have a continuous shelter deck. The vessel is designed to fish with bottom and midwater trawls for sardines, herring, and flatfish. In addition, there is gear for catching tuna with pole and line or long lines, a fish pump for sardine fishing, and two dories 29 feet long with 34-hp. motors for purse seining. For trawling and gill-netting the gear will be shot over the stern, but tuna fishing with poles will be done from platforms which fold out from the vessel's sides and stern. Small bait tanks on the platforms are filled from three large bait tanks. The fish pumps are of Soviet manufacture. The electronic equipment includes two radar sets, asdic, and 2 echo-sounders. (Fiskaren, a Norwegian fishery trade publication, March 15, 1961.)

\*\*\*\*\*

## U. S. S. R. (Contd.):

FISHING FOR OCEAN PERCH OFF  
NEWFOUNDLAND AND IN SEA  
OF JAPAN PLANNED:

A Lithuanian fishery fleet is preparing to fish for ocean perch off Newfoundland, according to the Russian publication Sovjetskaja Litva in its February 25, 1961, issue. The fleet will consist of 52 middle-size trawlers, of which 2 are for fishery research and exploration; the motherships Sovjetskaja Arktika and Sovjetskaja Litva; the freezer-ships Privolzhsk and Ju Janonis; fuel ships Kreking, Altuis, and Sambor; and the salvage vessel Rambinas.



Soviet fishermen have put in operation a successful ocean perch fishery in the Sea of Japan along the Primorcoast, according to the April 5 issue of Ekonomitsjeskaja Gazeta. It was thought earlier that in the Pacific Ocean area this species of fish occurred only in the Bering Sea. (Fiskets Gang, April 13, 1961.)

\*\*\*\*\*

## FISHING IN BERING SEA:

The Japanese fishing vessel Akebono Maru No. 50, independently trawling at a point some 50 kilometers northwest of Nunivak Island in the Bering Sea, early in April this year reported it sighted Soviet fishing fleets comprising 60 trawlers of the 250-300-ton class and the 600-ton class in operation in the same area. (Fisheries Economic News, April 14, 1961.)

\*\*\*\*\*

## FLASHING LIGHTS TO LURE HERRING:

Soviet experts have proposed a method of herring fishing based on the use of flashing lights mounted on the trawls. The experts made their proposals after a trip in the North Atlantic aboard the Severyanka, a submarine fitted out as a scientific laboratory.

A British correspondent writes: "If Russian experts succeed in attracting fish into the track of a trawl by artificial light, it will be a notable triumph. The reaction of sea fish to light has not been extensively studied in this country, though a research ship had an interesting experience a few years ago when engaged in a study of the pilchard fishery.

"A shoal had been located by echo-sounder and when a powerful light was shown over the ship's side, the shoal at once rose. The light was switched off and the shoal immediately returned towards the sea bed."

In the case of herring, in which the Russians have now a considerable interest in Atlantic waters, the fishery is greatly dependent on extensive vertical movements of the fish.

At night they rise to the upper waters and are taken in drift nets. By day they seek the bottom and are taken in trawls. These vertical movements correspond to the diurnal movement of plankton and it may be the response of this herring food to light that governs the mass movement of the fish. (The Fishing News, March 10, 1961.)

\*\*\*\*\*

STATEMENT ON FISHERIES  
PLANS AND RESEARCH:

Planned Fishery Catch for 1965: Boris Kulikov, an official in the Soviet Ministry of Fisheries, made a statement about the Soviet fisheries and fishing industry at the meeting of the International North Pacific Fisher-



### U. S. S. R. (Contd.):

ies Commission meeting in the fall of 1960. Kulikov was one of the two observers sent to the meeting by the U. S. S. R. The Russian observer indicated that in accordance with the seven-year-plan, the Russian fishing industry is supposed to harvest by 1965 4.6 million metric tons of fish and other sea animals as against 3.3 million metric tons planned for 1960; that means that the annual increment should exceed 200,000 metric tons.

This is to be achieved through the expansion of sea fisheries (which are closely correlated with research program), construction of new and modernization of old fishing vessels, and through rebuilding of fish stocks in inland seas and the development of fish-rearing in natural and artificial reservoirs.

The Russian observer further stated:

**Fisheries Are International:** "In developing our sea fisheries we should bear in mind both the interests of our country and the necessity of maintaining the rational utilization of marine resources with due consideration of the interests of other countries concerned.

"Our fishing industry people have no idea of developing sea fisheries other than in close cooperation with other countries in the field of rational exploitation of marine resources, such cooperation being duly based on the respect for each other's rights and interests.

"Successful expansion of sea fisheries requires much care about the future of the resources in the ocean. The more developed the means of production, the higher is the rate of exploitation of natural resources and, consequently, the more attention should be devoted to the reproduction aspect.

**Pacific Salmon Transplanted to Barents Sea:** "Our fishery scientists and research institutions tried to acclimatize Pacific salmon in the Southern Barents Sea as far back as in the thirties. Due to different reasons, some of them beyond our control, those experiments were not quite successful.

"In 1956 the experiments were resumed and they have been continued ever since in accordance with fish-rearing programs. Two main salmon species--pink and chum (*Oncorhynchus gorbuscha*, *O. keta*)--were chosen by our scientists as an object of acclimatization simply because of their earlier

descent to sea which almost excludes the problem of food competition between them and Atlantic salmon; as regards the food supply during the sea-life period of transplanted salmon, the availability of food is beyond any doubt,

"Nature has responded to this scientific effort in a very generous way. In the second half of 1960 more than 100 thousand specimens of pink salmon at the age of 1+ were registered in the trap nets off the Kola Peninsula, their size ranging from 46 to 52 cm. and weight amounting to 1.5 kg. It is noteworthy that the fish entered many more rivers other than those into which they had been released. For example, pink runs were observed in the rivers of the Arkhangelsk area. In northern Norway they constituted about 2 percent of the total salmon catch in 1960. According to unofficial reports, young pinks were also observed this year in the rivers of Iceland and Scotland. So you see that the northern pinks have shown a very sociable character and a great interest for travel.

"The task of acclimatization of Pacific salmon could not be fulfilled with any remarkable success without finding the adequate technique of transporting the eggs from the Far East to the Barents Sea area. The methods applied permitted decrease in the percentage of the eggs lost during travel to 0.5 percent for chum and 1.8 percent for pink salmon. New hatcheries were built and a number of old ones reconstructed; rearing technique also underwent some modification.

"While in 1957-58 salmon were released under ice in the rivers Kola and Umba of the Kola Peninsula, mainly in the stage of larvae with yolk sac not completely absorbed, in 1959 all the young were released from hatcheries only after they had attained the weight of 200 to 1,000 mgs. with the yolk sac completely dissolved. The young were released into the rivers Kola and Ura in the north and rivers Umba and Niva in the south, and the latter two rivers flow into the White Sea.

"The young fish were reared in the same ponds they had been placed in after hatching with an average number of 25,000 fish per one square meter.

"The young were fed by the eggs of fish herring, and other different species of fish, redfish larvae, minced frozen capelin, liver, etc.

"The approaches of pink runs to the European coast in 1960 have fully justified

## U. S. S. R. (Contd.):

the line taken by the scientists in their experimental work.

"No reports were received on the approaches of chum, as yet. However, since the young of chum were released for the first time in 1959, we may not expect them back in our northern rivers before 1962-64, that is when they grow up to 3+ to 5+, provided they retain the length of their sea-life period.

"The results achieved so far have, in our opinion, been quite satisfactory. Now we are confronted with two major problems: first of all, will the pink salmon produce the next generation under the natural conditions of the Barents Sea, and what European rivers will they find most suitable for spawning; secondly, how to safeguard the stocks and not to make them vulnerable to intensive fishing at this early stage of their formation. At present commercial catching of pink salmon is allowed neither in our rivers nor in the open sea.

"We believe that before definite conclusions are made much more research is required at this stage. We hope that the scientists of the countries whose rivers were approached by salmon this summer will help us by reporting the results of their observations. We are inclined to think that the problem of the acclimatization of Far Eastern salmon in the Barents Sea is already now outgrowing the national interests and becoming a matter of international importance.

Salmon Catches: "We hope to be understood correctly if we say that the experiments of acclimatization of salmon in the north were not being undertaken for the sole purpose of making up for the losses in the Far East. These experiments were conducted with a view to increasing the marine resources in accordance with the main principle of our planned economy. The problem of salmon stocks in the northwest Pacific still retains its urgent character. If you look at the matter from the viewpoint of the situation during the last 20 years you will see that the catches of salmon since the last richest odd year of 1949, when 263,000 metric tons were taken, have been gradually decreasing and amounted to only 94,000 metric tons in 1959. A similar picture is observed as regards the catches in even years. Against 177,000 metric tons produced by the richest

year of 1944 and a good catch of 160,000 metric tons in 1956, the 1958 catch decreased to 73,000 metric tons.

"The present year has not brought any consolation either. Judging from the preliminary results, our salmon fishing in the area is unlikely to reach the catch figure planned for 1960, nor shall we reach the level of the actual catch in 1958. The decrease in the run of pink salmon predicted by our scientists is quite noticeable this year. This makes us feel growing concern over the future of this valuable species in the northwest Pacific.

"Salmon constitutes an important item on the list of national resources of our country. On the state of salmon stocks depends something more than the well-being of the people engaged in salmon fisheries. So our interest in the way the other countries try to tackle and solve the problem of rational conduct of salmon fisheries should be quite understandable. We are grateful, therefore, for the invitation to attend the 7th session of the International North Pacific Fisheries Commission and are happy to have an opportunity to observe the discussions of these problems.

Other Fisheries: "The Soviet fishing industry is interested in the development and exploitation of all marine resources of the North Pacific. In the course of the recent research great concentrations of flat fish were found in the area. They now compose the dominant part in our catches, their monthly totals averaging 10,000-11,000 metric tons. Cod fishing is also likely to be expanded. Newly developed techniques of processing have stimulated the production of canned saury."

As to the Soviet crab fishing effort in 1960, the Russian observer stated that they did not attain the crabs-per-net by the Japanese Tokei Maru. Russian crab fishing is likely to continue on the same scale in 1967 in the waters adjacent to Bristol Bay.

The Russian observer then stated: "We do not specially fish for halibut in this area and halibut occurs in our catches only as individual specimens and serves as a sort of bonus for fishermen. It is hard, therefore, to calculate exactly how many specimens are caught in the trawl nets of our fishermen. I shall make no attempt, however, to hide our growing interest in this particular fish, or to rule out the possibility of starting experimen-

## U. S. S. R. (Contd.):

tal fishing for halibut in the near future for exploring the existing situation.

"The Soviet fishing industry is certainly interested in the expansion of fishing in the Pacific Ocean. We cannot separate our interests, however, from those of other countries and are always ready to cooperate."

Note: Also see *Commercial Fisheries Review*, Jan. 1961 p. 51.



## United Kingdom

## ELECTRONIC FISH-THAWING UNIT DEVELOPED:

With the development of freezing at sea by distant-water vessels, the need was created for a machine to thaw large quantities of frozen fish rapidly, economically, and in the least possible space. And an electronic fish-thawing unit has been produced by a British firm to meet this requirement.

One great advantage of electronic thawing is the uniformity of heating throughout the whole thickness of the fish. Apart from the shortened operating time, this method avoids the risk of surface deterioration such as drying and thermal damage, arising from the high surface temperatures necessitated by slower conventional thawing procedures using air and water as conducting media. The "waterlogging" characteristic of thawing in water is also avoided.

When the distant-water vessels return with the frozen fish, it is of great importance that a plant is available to thaw the fish in a manner which makes it indistinguishable from freshly-caught fish. Electronic thawing produces fish of consistently higher quality than any other large-scale method.

In the herring industry also, there are particular reasons why electronic thawing can be of great assistance. While small supplies are still available during the winter months, the quality of the fish landed is not entirely satisfactory for kippers out of season because the fat content falls below what is generally recognized to be desirable, for a period of 4 or 5 months during the year. Thus, large quantities are frozen at the height of the season.

Hitherto, a serious deterrent to the more widespread use of frozen herring for kipping has been the slowness of thawing and the consequent risk of the fish spoiling noticeably during the process. This is a hazard peculiar to herring because of the ease with which the fat goes rancid and of enzymic changes. Electronic thawing now enables these difficulties to be overcome completely.

As the seasonal shortage of white fish occurs roughly during the first quarter and that of herring during the second quarter of the year, the electronic thawing plant can be used for thawing white fish when fresh herring are available and vice versa.

Wide differences of temperature exist in different parts of the fish thawed by conventional methods. When fish is thawed by the electronic method the temperature is much more evenly distributed throughout. Thus, it is possible to thaw the fish without raising its temperature more than a few degrees above its freezing point so that no power is wasted in unnecessary heating.

By thawing herring electronically, it is possible to adjust their temperature so they go through a splitting machine at the right degree of firmness to give maximum yield and the minimum of torn meat. Compared with that of normally-thawed herring, the yield of "firsts" is considerably increased and the number of "seconds" is correspondingly decreased.

The advantage of the new method is particularly marked with very fat herring (which are normally so soft that they are often badly torn in passing through the splitting machine) and considerable saving is achieved. (*The Fishing News*, March 17, 1961.)

\* \* \* \* \*

## VERTICAL PLATE FREEZER FOR NEW STERN TRAWLER:

One of the most modern pieces of equipment scheduled for the new British stern-trawler *Lord Nelson*, is the vertical plate freezer, experimentally built at Torry Research Station, Aberdeen, but designed on a commercial scale by a British commercial firm.

This freezer, in its experimental stages, was installed in the Grimsby trawler *Northern Wave*, early in 1956, during her experimental voyages as a part-freezer ship on behalf of the British White Fish Authority and the trawler owners, and units of the design are fitted in the research trawler *Sir William Hardy*, attached to the Torry Station.

The unit has six stations in two groups of three, each formed by four embossed steel plates suspended vertically from their top edges on special gaslight trunnion connections. These enable the plates to hinge about the center line of the trunnions and they can, therefore, move apart at the bottom to release the frozen fish blocks formed between them.

Refrigerant flows through the channels formed in these embossed plates from the inlet to the outlet trunnion connections.

Each group of four plates is fed in parallel from manifolds into which the trunnions are inserted. The rectangular slots between the plates form the moulds or stations in which the fish blocks are frozen, and the bottoms of the stations are closed during the freezing cycle by bottom doors hinged into a horizontal position, one door for each group of three stations.

Mechanical linkages between the bottom doors and the freezer plates secure the latter in their closed (paralleled) position during the freezing cycle.

At the end of the freezing cycle hot gas is passed through the freezer plates to release the fish from the blocks; at the same time the bottom doors are dropped into their open (vertical) position, and this through the linkages moves the plates apart to release the blocks.

The frozen blocks drop out into the nets, from which they are removed for stowing in the frozen fish hold.

The design of the model in the *Lord Nelson* is much the same as that in *Northern Wave*, but special multichannel extruded aluminium plates have replaced the embossed steel ones, and these provide contact of the evaporating refrigerant over nearly the whole surface of the plates.

It is, therefore, possible with these to obtain a much shorter freezing cycle than with the earlier design. This has the advantage of reducing considerably space occupied

## United Kingdom (Contd.):

by a freezing plant of any given output, an important consideration in a vessel.

Special designs have been developed for freezing dressed cod after gutting and heading, and experience has shown that for Arctic cod the minimum convenient block thickness which can be used is 4 inches.

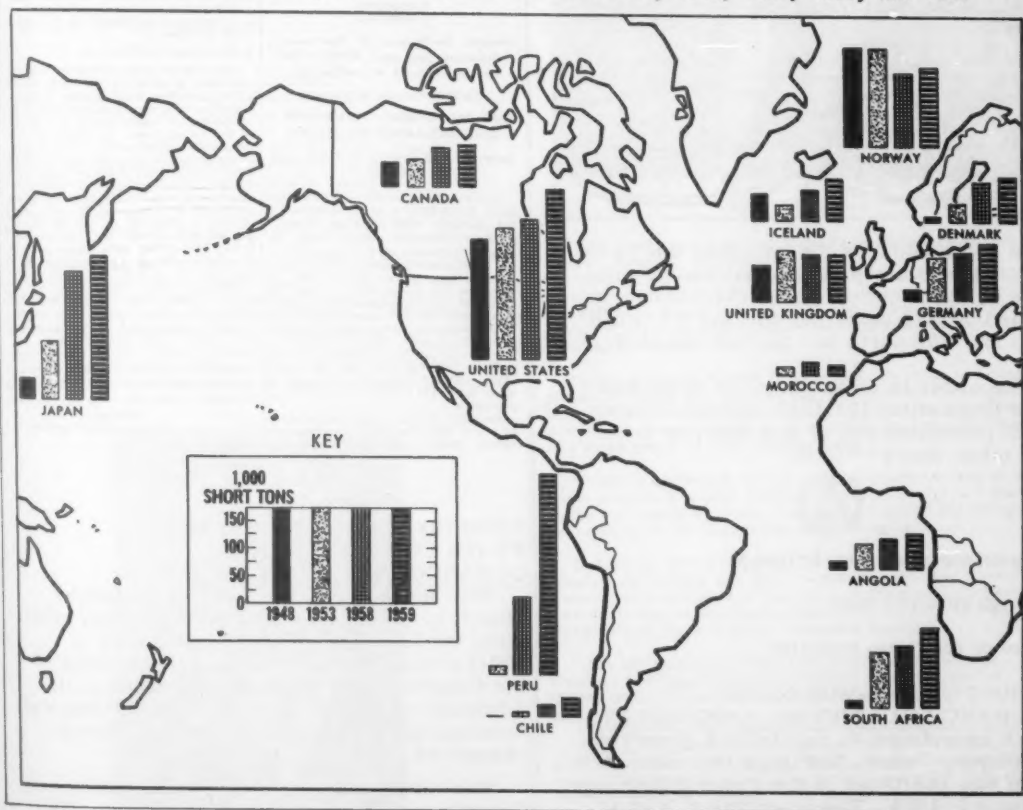
Experience with 4-inch blocks shows that with the correct evaporating temperatures and rates of refrigerant

circulation, freezing times as low as three hours are possible, but in general, a freezing cycle time of  $3\frac{1}{2}$  to  $3\frac{3}{4}$  hours should be allowed at the design stage to compensate for variations in block weights, contact between the fish and the freezing plates, etc.; this time includes that required for loading, defrosting, and unloading.

A special defrost cock is available for use in conjunction with each three-station half-freezer to change over from freezing to hot gas defrosting to release the blocks. This also has had the advantage of ensuring that the plates are free from ice at the commencement of each freezing cycle. (*The Fishing News*, March 17, 1961.)



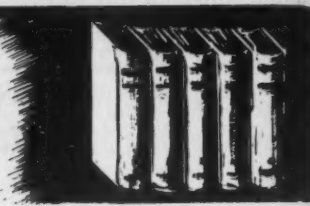
PRODUCTION OF FISHMEAL, BY MAJOR PRODUCING COUNTRIES, 1948, 1953, 1958, AND 1959







# FEDERAL ACTIONS



## Department of Health, Education, and Welfare

### FOOD AND DRUG ADMINISTRATION

#### ADDITIVE APPROVED FOR CANNED SHELLFISH:

An order published by the Food and Drug Administration in the April 4, 1961, Federal Register extends, permission for use of calcium disodium ethylene-diamine tetraacetate (calcium disodium EDTA) in canned crab meat and canned shrimp.



In both instances the specified use is to retard struvite crystal formation and promote color retention. The level of use is limited to 275 parts per million for crab meat and 250 parts per million for shrimp.

The order is an extension of Food Additives Regulation 121.1017, issued earlier, which permitted use of this additive in several other items of food.



## Department of the Interior

### FISH AND WILDLIFE SERVICE

#### BUREAU OF COMMERCIAL FISHERIES

#### FISHING VESSEL MORTGAGE INSURANCE CLARIFYING AMENDMENT:

An amendment to regulations governing the Fishing Vessel Mortgage Insurance program was published in the Federal Register of April 7, 1961. The amendment is of a clarifying nature to include a reference to

Public Law 86-577, which gives the Secretary of the Interior the same authority as is possessed by the Secretary of Commerce to borrow from the Treasury when such action is necessary to make payments on defaults of insured mortgages.

The amended regulation as published in the Federal Register follows:

#### **Title 50—WILDLIFE AND FISHERIES**

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

##### SUBCHAPTER F—AID TO FISHERIES

#### **PART 255—FISHING VESSEL MORTGAGE INSURANCE PROCEDURES**

Inclusion of Reference to Public Law 86-577

Incident to the transfer to the Department of the Interior of all functions of the Maritime Administration, Department of Commerce, which pertain to Federal Ship mortgage insurance of fishing vessels under authority of Title XI of the Merchant Marine Act of 1936, as amended, the act of July 8, 1960 (74 Stat. 314), clarified authority of the Secretary of the Interior under amendments to the Merchant Marine Act of 1936 enacted subsequent to March 22, 1958, citing in particular the amendment enacted July 15, 1958 (72 Stat. 358; 46 U.S.C. 1276). The following amendment is made to 50 CFR 255.1(a) to reflect these provisions.

Since this change is made as the result of act of Congress and is clarifying in nature notice and public procedure

thereon is deemed unnecessary and the amendment shall become effective upon publication in the Federal Register. As amended paragraph (a) of § 255.1 reads as follows:

##### § 255.1 Basis and purpose.

(a) Title XI of the Merchant Marine Act, 1936, as amended (46 U.S.C. 1271-1278), authorizes the Secretary of Commerce to insure certain eligible loans and mortgages on vessels owned by citizens of the United States. As found and determined by the Director of the Bureau of the Budget on March 22, 1958 (23 F.R. 2304), all functions of the Maritime Administration, Department of Commerce, which pertain to Federal Ship mortgage insurance of fishing vessels under authority of Title XI of the Merchant Marine Act of 1936, as amended (46 U.S.C. 1271-1278), were transferred to the Department of the Interior by section 8(a) of the Fish and Wildlife Act of 1956 (16 U.S.C. 742e). The Act of July 8, 1960, Public Law 86-577 (46 U.S.C. 1275—Note), among other things, clarified authority of the Secretary of the Interior under amendments to the Merchant Marine Act of 1936 enacted subsequent to March 22, 1958, citing in particular the amendment enacted July 15, 1958 (72 Stat. 358).

STEWART L. UNALL,  
Secretary of the Interior.

APRIL 3, 1961.

\*\*\*\*\*

#### **REVISED BUDGET INCLUDES FUNDS FOR SALMON AND OCEANOGRAPHY RESEARCH:**

The Secretary of the Interior stated on March 20, 1961, that the revised budget estimate for fiscal year 1962 (begins July 1, 1961) which President Kennedy submitted to the Congress is a great step forward in the Administration's programs in conserving and developing our Nation's natural and human resources.

The total increase for the U. S. Bureau of Commercial Fisheries is \$2.5 million. The increase of \$1.5 million for basic research

by the Bureau of Commercial Fisheries is necessary for continuation of an intensified salmon research program. The United States may lose a substantial portion of its North Pacific salmon fisheries in 1963 unless these resources are brought under a complete scientific conservation regime. This concept is the substance of the International Convention for the High Seas Fisheries of the North Pacific Ocean, which is subject to renegotiation in 1953.

The increase of \$1.0 million will allow for basic marine biological research as a part of the national program for oceanography. This is responsive to the President's interest expressed in his State of the Union message to the Congress as well as his statement on natural resources. Significant additional knowledge of the marine biological processes is essential for defense and resource development.

\*\*\*\*\*

#### TOP FISHERY POSTS FILLED:

Appointments for the top fishery posts in the U. S. Department of the Interior have now all been completed.

Assistant Secretary for Fish and Wildlife: Frank P. Briggs, newspaper publisher, former U. S. Senator, a member of the Missouri Conservation Commission for many years and four times chairman of that body, is the Assistant Secretary of the Interior for Fish and Wildlife. He was appointed by the President on February 6, 1961.

Briggs filled the unexpired term of Harry S. Truman when Senator Truman became Vice President. He has been owner and editor of the *Macon Chronicle-Herald* since 1924 and has twice received the University of Missouri School of Journalism award for distinguished service.

He was born in Armstrong, Mo., February 25, 1894, and graduated from the University of Missouri School of Journalism in 1915.



Frank P. Briggs



Clarence F. Pautzke

Commissioner, Fish and Wildlife Service: President John F. Kennedy, following consultation with Secretary of the Interior Stewart L. Udall, announced on March 22 his selection of Clarence F. Pautzke, 53, Deputy Commissioner of the Alaska Department of Fish and Game, as Commissioner of the Fish and Wildlife Service. Pautzke is a native of Auburn, Wash.

Before going to Alaska in May 1960, Pautzke had completed 30 years employment with the State of Washington—three years with the Department of Fisheries, 24 years with game and game fish work in the Department of Game, and three years of other employment.

On three occasions he has been on research duty at the South Pacific Weapons Testing Center at Bikini and Eniwetok as a member of the staff of the Applied Fisheries Laboratory of the University of Washington.

In 1959 he was a member of the American delegation of fishery specialists who spent a month inspecting Russian fishery laboratories and fishery activities on Kamchatka Peninsula and on the nearby mainland. In 1957 he was President of the American Fisheries Society.

As Commissioner of the Fish and Wildlife Service, Pautzke will supervise the activities of the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.

Aide to Assistant Secretary for Fish and Wildlife: Robert M. Paul of Riverside, Calif., has been selected as special assistant to the Assistant Secretary for Fish and Wildlife Frank P. Briggs. The Secretary of the Interior announced this appointment on March 20. Paul will serve as the principal aide to Assistant Secretary Frank P. Briggs.



Robert M. Paul

Born in Huntington, Ind., on February 1, 1924, Paul has been executive secretary of the Sport Fishing Institute since 1957. He was staff assistant to the Director of California's Department of Fish and Game from 1948 until he joined the Sport Fishing Institute. He was graduated from the University of California in 1948 with a degree in engineering. He is a member of the American Fisheries Society, the Wildlife Society, and other organizations interested in fish and wildlife activities.



## Department of the Treasury

### COAST GUARD

#### FISHERIES LAW ENFORCEMENT AIDED:

In order to more fully utilize the available facilities of the U. S. Coast Guard, plans have been made to augment offshore inspections of fishing vessels in the North Atlantic. The personnel of five Coast Guard cutters which are assigned to search and rescue activities in the North Atlantic area have been instructed



in fisheries enforcement procedures by enforcement agents of the U. S. Bureau of Commercial Fisheries and will now inspect nets in connection with all routine boardings.

Bureau scientists have determined that the international net-mesh regulations for the Northwest Atlantic, which have been in effect since 1953, have been beneficial in many ways. Larger net sizes have allowed the escape of small haddock and cod and permitted their growth to a marketable size.



### White House

#### CONVENTIONS ON LAW OF THE SEA SIGNED BY PRESIDENT:

On March 24, 1961, the President of the United States signed the instruments of ratification of the following Conventions formulated at the United Nations Conference on the Law of the Sea, Geneva, February 24 to April 27, 1958:

1. Convention on the Territorial Sea and the Contiguous Zone;
2. Convention on the High Seas;
3. Convention on Fishing and Conservation of the Living Resources of the High Seas; and
4. Convention on the Continental Shelf.

Copies of said instruments of ratification were forwarded to the Secretary General of the United Nations for deposit.

Note: Also see *Commercial Fisheries Review*, May 1960 p. 40; February 1960 p. 61; November 1959 p. 100; August 1959 p. 40; February 1959 p. 49; January 1959 pp. 54 and 71.

\* \* \* \* \*

#### PRESIDENT ASKS INCREASE IN FISCAL YEAR 1962 BUDGET FOR OCEANOGRAPHIC RESEARCH:

Additional funds for the national oceanographic research program are included in the President's March 29 request to Congress to increase the fiscal year 1962 budget of several agencies chiefly to strengthen research programs and to expand programs to promote export trade and travel to the United States. For the national oceanographic program, an estimated budget of \$97,501,000 is indicated for FY 1962 as against an estimated \$55,009,000 for FY 1961, and an actual expenditure of \$45,943,000 for FY 1960. Among the agencies involved are the Departments of Defense, Commerce, Interior, Treasury, and Health, Education & Welfare; also the National Science Foundation and the Atomic Energy Commission. Proposed budget for the Department of the Interior is \$15,472,000

in FY 1962 as compared to \$6,704,000 for FY 1961 and \$6,723,000 for FY 1960.

The President's March 29 letter to the President of the Senate urging the appropriations indicated follows:

"My dear Mr. President:

"The seas around us, as I pointed out in my message to the Congress on February 23, represent one of our most important resources. If vigorously developed, this resource can be a source of great benefit to the Nation and to all mankind.

"But it will require concerted action, purposefully directed, with vision and ingenuity. It will require the combined efforts of our scientists and institutions, both public and private, and the coordinated efforts of many Federal agencies. It will involve substantial investments in the early years for the construction and operation of ship and shore facilities for research and surveys, the development of new instruments for charting the seas and gathering data, and the training of new scientific manpower.

"We are just at the threshold of our knowledge of the oceans. Already their military importance, their potential use for weather predictions, for food and for minerals are evident. Further research will undoubtedly disclose additional uses.

"Knowledge of the oceans is more than a matter of curiosity. Our very survival may hinge upon it. Although understanding of our marine environment and maps of the ocean floor would afford to our military forces a demonstrable advantage, we have thus far neglected oceanography. We do not have adequate charts of more than one or two percent of the oceans.

"The seas also offer a wealth of nutritional resources. They already are a principal source of protein. They can provide many times the current food supply if we but learn how to garner and husband this self-renewing larder. To meet the vast needs of an expanding population, the bounty of the sea must be made more available. Within two decades, our own nation will require over a million more tons of seafood than we now harvest.

"Mineral resources on land will ultimately reach their limits. But the oceans hold untapped sources of such basic minerals as salt, potassium and magnesium in virtually limitless quantities. We will be able to extract additional elements from sea water, such as manganese, nickel, cobalt and other elements known to abound on the ocean floor, as soon as the processes are developed to make it economically feasible.

"To predict, and perhaps some day to control, changes in weather and climate is of the utmost importance to man everywhere. These changes are controlled to a large and yet unknown extent by what happens in the ocean. Ocean and atmosphere work together in a still mysterious way to determine our climate. Additional research is necessary to identify the factors in this interplay.

"These are some of the reasons which compel us to embark upon a national effort in oceanography. I am therefore requesting funds for 1962 which will nearly double our Government's investment over 1961 . . . ."

#### "1. Ship Construction

"The proposed program for 1962 includes \$37 million for ship construction, an increase of \$23 million over 1961. This will provide for 10 oceanographic vessels. Only two will replace existing ships. The others will be used to meet needs that have long existed in Federal agencies and other oceanographic institutions conducting research for the Government.

"The present United States oceanographic fleet is composed of 27 research ships and 17 survey vessels. All but two were constructed prior to the end of World War II; many are over thirty years old. Only two of the ships were designed specifically for research purposes; the remainder has been converted from a variety of ships designed for other uses. Thus

the success of the national oceanographic program will depend heavily on the construction of the new specially designed vessels proposed for 1962.

#### "2. Shore Facilities and Data Center

"Shore facilities are urgently required to provide laboratory space for analysis and interpretation of data and to train new oceanographers. In oceanographic research about five scientists and technicians are required ashore for each scientist aboard ship.

"For 1962, \$10 million is being requested for laboratories and wharfside facilities. This represents a five-fold increase over 1961. It includes, for example, funds for a new Bureau of Commercial Fisheries laboratory to replace a forty-year old structure and additional laboratory space at universities and other oceanographic institutions.

"An essential part of the shore establishment is the new National Oceanographic Data Center which will begin its first full year of operation in 1962. This Center will make available to the scientific community oceanographic data collected throughout the world.

#### "3. Basic and Applied Research

"The conduct of research is the central purpose of our whole national effort in oceanography. New ships and shore facilities are essential tools of scientific research, but it is the research itself that will yield new knowledge of the earth's 'inner space,' and new uses of the sea. The proposed program includes \$41 million for basic and applied research in oceanography. This is an increase of \$9 million over the 1961 level.

"Basic research is the cornerstone on which the successful use of the seas must rest. Progress here is largely dependent on the work of scientists at many universities and laboratories throughout the United States and on ships at sea. Their investigations cover all aspects of the marine environment, the motion and composition of ocean waters, the evolution and distribution of marine plants and animals, the shape and composition of the ocean bottom, and many other geophysical and biological problems. Of timely significance is the attempt to penetrate to the earth's mantle to better our understanding of the origin and history of our planet. This undertaking, known as Project MOHOLE, involves the development of new drilling methods that can be used in the deep seas. This project has recently resulted in a spectacular achievement. Samples from nearly a thousand feet beneath the sea floor were obtained by drilling in three thousand feet of water.

"Considerable attention will also be given to applied problems in the marine sciences. Oceanographers will be studying such problems as sound propagation in water, the effects of changes in ocean conditions on the movement of ships, weather forecasting, and fisheries management. Methods of predicting changes in ocean conditions also are being developed. Eventually they lead to maps of 'weather within the sea' much like the atmospheric weather maps of today.

"Many advances are being made in methods of exploring the seas. Oceanographers are now able to descend to the great depths in bathyscaphes. New electronic equipment will allow them to probe the ocean and to 'see' with sound pulses what before has been opaque. Using these new techniques, our scientists already have discovered vast currents below the ocean surface a thousand times larger than the flow of the Mississippi.

#### "4. Training of Oceanographers

"The most important part of our long-range program in oceanography is the training of young scientists. Scientific manpower of every sort will be needed--technicians, college graduates, and post-graduate researchers--and they must be trained in many scientific disciplines. This training should go hand in hand with the conduct of research at universities



Table 1 - National Oceanographic Program Budget--  
Summary by Federal Agency

	Actual FY 1960	Estimated FY 1961	Estimated FY 1962
		(\$1,000)	
Defense . . . . .	23,003	22,729	32,837
Commerce . . . . .	6,202	11,389	24,691
Interior . . . . .	6,723	8,704	15,472
National Science Foundation . . . . .	7,833	9,148	19,607
Atomic Energy Commission . . . . .	1,708	2,207	3,619
Health, Education & Welfare . . . . .	340	698	1,150
Treasury . . . . .	134	134	134
Totals . . . . .	45,943	55,009	97,501

and other oceanographic institutions. By their support of these institutions, the programs of the National Science Foundation, the Office of Naval Research, and the Department of Health, Education and Welfare will be of major importance to an expanding program in oceanography; for they can result in the education of new young scientists as well as in the production of new knowledge. In the coming year, these agencies are undertaking to increase the number of fellowship awards and graduate student research contracts, and they also will encourage the development of new university programs in oceanography.

#### "5. Ocean Surveys

"World-wide surveys of the oceans--their properties, their contents and boundaries--are needed to make charts and maps for use of scientists in their research programs and for a variety of commercial and defense applications. The United States' ocean survey program for FY 1962 is being increased within the limits of ships available for this purpose. I am requesting additional funds to allow the Coast and Geodetic Survey to extend the operating season of its existing ships, thus making the maximum use of limited ship resources. As already mentioned, funds are included for a new survey ship which will increase our deep-sea survey capability.

#### "6. International Cooperation

"Oceanography is a natural area of opportunity for extensive international cooperation. Indeed, systematic surveys and research in all the oceans of the world represent tasks of such formidable magnitude that international sharing of work is a necessity.

"Our present maps of the oceans are comparable in accuracy and detail to maps of the land areas of the earth in the early part of the 18th century. Precise methods of measuring ocean depths have become available during the last ten years, and these, when combined with new developments in navigation, should make possible for the first time modern maps of the topography of the entire sea floor. An accurate mapping of the oceans will require international cooperation in ship operations and in establishing a world-wide system of navigation. In these endeavors the United States can play a leading part.

Table 2 - National Oceanographic Program Budget--  
Summary by Function

	Actual FY 1960	Estimated FY 1961	Estimated FY 1962
		(\$1,000)	
Research . . . . .	26,577	31,883	40,794
Ship Construction . . . . .	13,533	13,975	37,050
Surveys . . . . .	4,168	7,117	8,725
Facilities . . . . .	1,370	1,768	10,422
Data Center . . . . .	295	266	510
Totals . . . . .	45,943	55,009	97,501

"This year an Intergovernmental Oceanographic Commission is being established under UNESCO to provide a means whereby interested countries can cooperate in research and in making surveys and maps of the deep sea floor, the oceanwaters, and their contained organisms. Membership on the Commission is open to all countries of the UN family that desire to

cooperate in oceanography. The United States intends to participate fully in the activities of the Commission.

"The United States also will participate in the International Indian Ocean Expedition. Many nations, including the Soviet Union, are cooperating in this expedition under the non-governmental sponsorship of the International Council of Scientific Unions. Over a quarter of the world's people live in the countries surrounding the Indian Ocean. If more can be learned of the Indian Ocean's extensive food resources, these nations can be helped to develop and expand their fishing industries as part of their general economic development.

#### "7. The Coast Guard

"At present, the Coast Guard enabling legislation limits the extent to which the Coast Guard can engage in scientific research. Only the International Ice Patrol is authorized to make such studies. I recommend that the statutory limitations restricting the participation by the Coast Guard in oceanographic research be removed. With ocean weather stations, deep-sea thermometers, and other data collection devices, our Coast Guard can make a valuable contribution to the oceanographic program.

#### "CONCLUSION

"Knowledge and understanding of the oceans promise to assume greater and greater importance in the future. This is not a one-year program--or even a ten-year program. It is the first step in a continuing effort to acquire and apply the information about a part of our world that will ultimately determine conditions of life in the rest of the world. The opportunities are there. A vigorous program will capture those opportunities.

"Sincerely,

"John F. Kennedy

"Honorable Lyndon B. Johnson  
President of the United States Senate  
Washington, D. C."



### Eighty-Seventh Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.



**CATCH TRANSFER AT SEA:** On May 2, the Senate Committee on Commerce, in executive session, ordered favorably reported S. 1222, relating to the documentation and inspection of U. S. vessels. The purpose of this bill is to legalize transferring the catch of one fishing vessel to another on the high seas, and transporting it without charge to a port of the United States.

**DEPRESSED AREAS: Area Redevelopment Act** (Hearings before Subcommittee No. 2 of the Committee on Banking and Currency, U. S. House of Representatives, Eighty-Seventh Congress, First Session on H.R. 4569, a bill to establish an effective program to alleviate conditions of substantial and persistent unemployment and underemployment in certain economically distressed areas, Feb. 24, 27, 28, Mar. 1-10, and 13, 1961), 911 pp., printed. Contains letter from the President with draft of legislation (H.R. 4569) proposed by him, statements and comments of Government officials, various state officials, industrial associations; comments, letters, and telegrams of various officials; tables and exhibits (14).

On April 20 the conferees, in executive session, agreed to file a conference report (H. Rept. No. 256) on the differences between the Senate- and House-passed versions of S. 1, proposed Area Redevelopment Act of 1961. The Senate adopted the conference report. Motion to reconsider was tabled. The report also was filed in the House.

On April 26 the Senate adopted conference report on S. 1; this cleared the bill for the President's signature.

The Senate on April 27 received message from House stating that the House had agreed to the report of the Committee of Conference on S. 1.

On May 1 the President signed S. 1 (P. L. 87-27).

**EXPORT POLICY ACT: S. 1729** (Engle and 5 others), introduced in Senate April 27, a bill to promote the foreign commerce of the United States, and for related purposes; to the Committee on Commerce. Would provide for expanding United States exports. Similar to other bills on the same subject.

**FEDERAL BOATING ACT AMENDMENTS:** On April 20 the Senate Committee on Commerce reported S. 883, a bill to extend the application of the Federal Boating Act of 1958 to certain possessions of the United States (S. Rept. No. 178), with amendment.

**FISH AND WILDLIFE ASSISTANT SECRETARY OF THE INTERIOR: Sundry Nominations--1961** (Hearings before the Committee on Interstate and Foreign Commerce, United States Senate, Eighty-Seventh Congress, First Session, on Nominations for Civil Aeronautics Board, Commerce Department, Federal Trade Commission, Interior Department, Interstate Commerce Commission, United States Coast Guard, March 8, 14, 15, and 22, 1961), 89 pp., printed. Includes nomination of Frank P. Briggs, Assistant Secretary of the Interior for Fish and Wildlife, with statements of the 2 Missouri Senators, the Director of National Wildlife Federation, an official of the National Fisheries Institute, and Frank P. Briggs himself.

**FISH HATCHERY: H. R. 6467** (Baker), introduced in House April 19, a bill to provide for the establishment of a new fish hatchery in the eastern part of the State of Tennessee; to the Committee on Merchant Marine and Fisheries. Also S. 1686 (Gore and Kefauver), introduced in Senate on April 20, to Committee on Commerce; and H. R. 6529 (Frazier) introduced in House on same date, to Committee on Merchant Marine and Fisheries.

**GAME AND FOOD FISH CONSERVATION IN DAM RESERVOIRS: H. R. 6921** (Olsen), introduced in House May 9, a bill to direct the Secretary of the Interior to

establish a research program in order to determine means of improving the conservation of game fish in dam reservoirs; to the Committee on Merchant Marine and Fisheries.

**GULF OF MEXICO OUTER CONTINENTAL SHELF RESTRICTIONS: H. R. 6745** (Aspinall), introduced in House May 2, a bill to provide for the restriction of certain areas in the Outer Continental Shelf for defense purposes, and for other purposes (Matagorda Water Range); to the Committee on Interior and Insular Affairs. The bill would restrict mineral leasing from approximately 1,803,501 acres of Outer Continental Shelf lands located in the Gulf of Mexico off Matagorda Island and the coast of Texas. The restriction would be for a period of three years with an option to renew for three additional years.

The proposed restricted area includes excellent shrimp beds which produce substantial revenues to the commercial fisheries. The area waters also include the production of red snapper and large schools of herring and anchovy-like fishes. The latter two species are largely unexploited at the present time, but constitute a great potential source of industrial fish for use in fish meal and pet food. The restriction as proposed in the bill, however, is limited to mineral leasing and the rights of the commercial fishermen would not be impaired.

On May 12, the Subcommittee on Public Lands of the House Committee on Interior and Insular Affairs held a hearing on H. R. 6745. Testimony was given by Air Force and Interior Department officials, and various public witnesses. Also H. R. 6849 (Rutherford) was introduced in House May 4.

**IMPORT COMPETITION ADJUSTMENT:** On April 19 the Senate received a resolution of the House of Representatives of the State of Missouri memorializing Congress to adjust the tariff laws of the United States for the protection of our domestic industry from the deleterious competition of foreign-made goods; to Committee on Finance.

S. 1735 (Muskie), introduced in Senate April 27; to the Committee on Finance. Would provide for adjustment of conditions of competition of foreign and domestic industries with respect to level of wages and working conditions in production of imported articles. Similar to other bills on same subject. Also H. R. 6688 (Bray), introduced in House on April 27.

**INCOME TAX REVISIONS IN FAVOR OF FISHERMEN: H. R. 6493** (Wilson of California), introduced in House April 19, a bill to extend to fishermen the same treatment accorded farmers in relation to estimated income tax; to Committee on Ways and Means. Identical to H. R. 6413 (King of California).

The House Committee on Ways and Means ordered favorably reported (H. Rept. 346) on April 25 to the House, H. R. 6413.

H. Rept. 346, Declaration of Estimated Income Tax by Fishermen (May 3, 1961, 87th Congress, 1st Session, report of the Committee on Ways and Means, to accompany H. R. 6413), 5 pp., printed. Contains summary of legislation, a general statement, changed in existing law, and excerpts from the Internal Revenue Code of 1954.

H. R. 6413 was brought up in the House and passed by a voice vote on May 10. The bill was sent to the

Senate for action. Provides that a fisherman rather than file a declaration of estimated tax by April 15 of the taxable year and making quarterly payments of the tax, will be permitted to file the declaration of tax and pay the tax in full by January 15 following the taxable year. Fishermen would still have until April 15 to file a final tax return for the year and there would be no penalty for an underestimate of the tax if the estimate was as much as two-thirds of the actual tax due. In addition, if the fisherman files his final return for the year and pays the tax due on his return by February 15--instead of the usual April 15--he would not be subject to any penalty because of his January 15 estimate being too low. Would apply to taxable years beginning after December 31, 1961.

H. R. 6413 on May 11 was referred to the Senate Finance Committee.

**INTERIOR DEPARTMENT APPROPRIATIONS FY 1962:** On April 18 H. R. 6345, Interior Department Appropriations for fiscal year 1962, was passed by House and referred to Senate Committee on Appropriations.

On May 1-10, 1961, the subcommittee of the Senate Committee on Appropriations held hearings on H. R. 6345, with testimony given by members of both houses of Congress, and various officials from the Department of the Interior. On May 8, on funds for fish and wildlife items, testimony was received from several Senators, the Commissioner of Fish and Wildlife, and the directors of the Bureau of Commercial Fisheries, and the Bureau of Sport Fisheries and Wildlife.

**MARINE MAMMAL HIGH SEAS PROTECTION:** H. R. 6923 (Olsen), introduced in House May 9, a bill for the protection of marine mammals on the high seas, and for other purposes; to the Committee on Merchant Marine and Fisheries. House Committee on Merchant Marine and Fisheries Subcommittee on Fisheries and Wildlife Conservation held hearings on H. R. 777, May 9-10, 1961, for the protection of marine mammals on the high seas. Witnesses from the Department of the Interior appeared before the Committee.

**MINIMUM WAGE LEGISLATION:** On April 19 the Senate continued its consideration of H. R. 3935, Fair Labor Standards Amendments of 1961. Several amendments were adopted and some were rejected, none of which pertained directly to the fishing industry.

On April 20 the Senate passed H. R. 3935 as amended by adoption of amended committee amendment (in nature of a substitute), which provides \$1.25 minimum wage to be reached in 28 months by presently-covered workers, and in 40 months by newly-covered workers, the minimum wage in the interim to be \$1.15. Would include seafood processing employees under minimum wage but not for overtime (seafood cannerys are treated in this way under the present law). This means that the exemption in the present law for onshore processing would be cancelled. The exemption from minimum wage for offshore or vessel processing still applies.

Senate on April 24 insisted on its amendments to H. R. 3935, agreed to hold conference with the House, and appointed conferees. House on April 24 disagreed to Senate amendments to H. R. 3935, requested conference with the Senate, and appointed conferees. Conferees met in executive session on April 25 but did not reach final agreement. For fish processing exemptions, the Senate version, unlike that of the House, eliminated

the minimum wage exemption for shore-based fishery processing operations.

On May 1 conferees in executive session agreed to file a conference report on the differences between the Senate and House-passed versions of H. R. 3935. On May 2, the Committee on Conference filed conference report (H. Rept. 327).

H. Rept. 327 Fair Labor Standards Amendments of 1961 (May 2, 1961, Report of the Committee of Conference, House of Representatives, 87th Congress, 1st Session, to accompany H. R. 3935), 21 pp., printed. Contains text of bill as agreed upon by Conference Committee and a statement of the managers on the part of the House.

On May 3, by 64 yeas to 28 nays, the Senate adopted the Conference Committee report. Also, by a record vote of 230 yeas to 196 nays the House adopted the conference report on the same day. This action cleared the legislation for the President's signature.

With regard to seafood processing, Congressman James Roosevelt, a member of the House-Senate Conference Committee in the May 4, 1961, Congressional Record (page 6924) inserted a statement which was omitted the previous day. The material omitted was to be inserted on page 6716 of the Congressional Record for the House of May 3, 1961. The statement referred to follows:

"I have been asked what the thinking of a majority of the House committee of conference on wage-hour legislation (H. R. 3935) was with respect to language appearing in the Senate committee report dealing with seafood processing.

"The House Conferees accepted the provisions of the Senate bill covering for minimum wage purposes only, such employees, and the inquiry is whether it was not our desire also to approve the explanation dealing with this matter which appeared in the Senate Labor Committee report on its bill. That language is as follows and appears on page 33 of the report:

"An estimated 33,000 persons who are employed in the activities removed from the section 13(a) (5) exemption will have minimum wage protection but will continue to be exempt from the act's overtime requirements under an amended section 13(b) (4). The bill will thus have the effect of placing fish processing and fish canning on the same basis under the act. There is no logical reason for treating them differently and their inclusion within the act's protection is desirable and consistent with its objectives.

"The present exemptions in sections 13(a) (5) and 13(b) (4) have been judicially interpreted to apply to all employees employed in the seafood industry including any employee who participates in activities which are necessary to the conduct of the operations specifically described in the exemptions (McComb v. Consolidated Fisheries Company, 174 F. 2d 74, C.A. 3, 1949). These interpretations are consistent with the Congressional purpose of treating all employees of one establishment in the same manner under the act and of avoiding segmentation as between different employees of the same employer engaged in the named operations."

"There are also additional statements in the report explaining other provisions of the bill which we did not feel it necessary to amplify. Since a question had arisen, however, specifically on this point, I feel the record

should be made clear. I believe such language reflects correct legislative intent."

H. R. 3935 was signed by the President on May 5 (P. L. 87-30).

The new law (1) extends minimum wage coverage to approximately 3.6 million workers, (2) establishes the 5-year escalation period to reach the minimum wage of \$1.25 and the 40-hour workweek, and (3) adopts the so-called inflow test, which means that retail and service enterprises would be covered by the bill, only if they met the following test: (a) employer must be engaged in commerce or the production of goods for commerce, (b) employer must receive \$250,000 worth of goods, for resale, which have moved across State lines (so-called "inflow" test), and (c) employer must have an annual gross volume of sales of not less than \$1 million, exclusive of excise taxes at the retail level. The minimum wage provisions become effective on September 3, 1961.

Increases the minimum wage under the act for presently-covered employees to \$1.15 an hour for the first two years after effective date of the act and \$1.25 an hour beginning 2 years after the effective date. Newly covered workers receive \$1 an hour for the first three years of the new act; the fourth year they go to \$1.15; and the fifth year \$1.25. No overtime coverage for first two years of the act; in the third year, 44 hours; the fourth year, 42 hours; and the fifth year, 40 hours.

With regards to onshore or shore-based fishery processing, the bill changes the exemption in the act for processing, marketing, freezing, curing, storing, packing for shipment, or distributing fish and certain other marine products from a minimum wage and overtime exemption to an overtime only exemption. The present complete exemption is retained for offshore processing. The exemption for offshore processing in the bill—Sec. 9 Subsection (a) (5)—now reads: "(5) any employee employed in the catching, taking, propagating, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds, or other aquatic forms of animal and vegetable life, or in the first processing, canning or packing such marine products at sea as an incident to, or in conjunction with, such fishing operations, including the going to and returning from work and loading and unloading when performed by any such employee; . . ."

Both cannery and other processors of fishery products ashore are now in the same category—employees of such enterprises are included under the minimum wage but the enterprises continue to retain the year-round exemption from overtime payments. But in practice, however, complete equality between the two segments will not be achieved for five years. On and after September 3, 1961, all shore operations by the fishing industry other than canning will be required to pay wages at these minimum rates: First year after effective date \$1.00 an hour, second year \$1.00 an hour, third year \$1.00 an hour, fourth year \$1.15 an hour, and fifth year after effective date \$1.25 an hour. Since fishery canning operations were already covered under the act before this amendment, employees of those enterprises will receive a minimum wage of \$1.15 an hour for the first two years after the effective date of the act and \$1.25 an hour beginning 2 years after the effective date.

Sec. 3, Section 4 of the Act is amended by adding at the end thereof the following new subsection:

"(e) Whenever the Secretary of Labor has reason to believe that in any industry under this Act the competition of foreign producers in United States markets or in markets abroad, or both, has resulted, or is likely to result, in increased unemployment in the United States, he shall undertake an investigation to gain full information with respect to the matter. If he determines such increased unemployment has in fact resulted, or is in fact likely to result, from such competition, he shall make a full and complete report of his findings and determinations to the President and to the Congress: Provided, That he may also include in such report information on the increased employment resulting from additional exports in any industry under this Act as he may determine to be pertinent to such report."

**NATIONAL AQUARIUM IN THE DISTRICT OF COLUMBIA:** On April 24, the House Committee on the District of Columbia held public hearings on H. R. 111 and H. R. 5990, identical bills to authorize construction of a National Aquarium in the District of Columbia. The National Capital Parks Planning Commission reported that the most acceptable location probably would be on Hains Point, a federally-owned peninsula jutting out into the Potomac River comparatively near the Jefferson Memorial. A number of representatives of conservation organizations spoke on behalf of the bill.

**NATURAL RESOURCES CONSERVATION:** On May 16 the Senate received a resolution from the Senate and Assembly of the State of California endorsing proposals made by the President in his message to Congress outlining his program for development of our natural resources, including ocean resources and fish conservation.

**NETTING IMPORTS FOR RESEARCH:** S. 1814 (Metcalf), introduced in the Senate May 8, a bill to provide for the free importation of monofilament gill nets for use in fish sampling; to the Committee on Finance.

**OCEANOGRAPHIC RESEARCH PROGRAM:** On May 1 both houses of Congress received a resolution of the House of Representatives of the State of Alaska urging the President and Congress of the United States to give favorable consideration to S. 901, the Marine Sciences and Research Act of 1961, and effect its passage and approval as soon as possible.

Also on May 3, the Senate received a resolution from the port commission of the port of Seattle petitioning the Congress of the United States of America to enact S. 901.

H. R. 6845 (Geo. P. Miller), introduced in House May 4, a bill to amend title 14 of the United States Code to provide for an expansion of the functions of the Coast Guard; to the Committee on Merchant Marine and Fisheries. Provides that the Coast Guard "shall engage in oceanographic research on the high seas and in waters subject to the jurisdiction of the United States." On May 17, H. R. 6845 was reported out of Committee without amendment (H. Rept. 403).

On May 16 the Senate Committee on Commerce in executive session ordered favorably reported S. 1189, authorizing the Coast Guard to carry on certain oceanographic research (amended).

**POLLUTION OF SEA CONVENTION:** On May 2, the Senate Committee on Foreign Relations, in executive session, ordered favorably reported the International Convention on the Prevention of Pollution of the Sea by Oil (Ex. C. 86th Cong., 2nd Sess.).



International Convention for the Prevention of Pollution of the Seas by Oil--1961 (Hearing before the Committee on Foreign Relations, United States Senate, Eighty-Seventh Congress, First Session, on Ex. C. 86th Congress, 2nd Session, April 25, 1961), 38 pp., printed. Contains statements of officials of the National Audubon Society, Department of State, National Wildlife Federation, and the American Humane Education Society, and an Appendix.

On May 15, the Senate debated treaty Ex. C., the International Convention for the Prevention of Pollution of the Seas by Oil. The Convention was considered as having passed through its parliamentary stages up to and including the resolution of ratification.

On May 16 the Senate by unanimous vote of 92 yeas, ratified the treaty "International Convention for the Prevention of Pollution of the Seas by Oil" (Ex. C. 86th Cong., 2d Sess.). The purpose of this convention is to prevent the pollution of the seas by oil and oily wastes by regulating the discharge thereof by tankers and other ships. The regulations imposed by the convention are directed solely at seagoing ships registered in the territory of a contracting party which are over 500 tons gross tonnage and are not being used as naval auxiliaries, in whaling, or in navigating the Great Lakes and certain tributaries.

**RESEARCH AND DEVELOPMENT CONTRACT COSTS:** H. R. 6440 (Mrs. Hansen), introduced in the House on April 18, a bill to provide for a method of payment of indirect costs of research and development contracted by the Federal Government at universities, colleges, and other educational institutions; to Committee on Government Operations.

**SAFETY OF LIFE AT SEA CONVENTION:** Senate on April 27 removed injunction of secrecy from Executive K, 87th Congress, 1st Session, the International Convention for Safety of Life at Sea, 1960. Executive K was transmitted by the President to the Senate on April 27, together with the report of the Secretary of State, a copy of the final act of the Convention held at London from May 17 to June 17, 1960, and a copy of the report of the delegation of the United States to that Conference. The Convention, open for signature from June 17 to July 17, 1960, was signed by the United States on June 17 and by 39 other Governments in that period.

**SALTONSTALL-KENNEDY ACT FUNDS REAPPORTIONMENT:** H. R. 6489 (Sikes), introduced in House a bill to amend the act of August 11, 1939, relating to domestically-produced fishery products to establish a fund for the advancement of commercial fisheries. H. R. 6554 (Dent), introduced in House April 20 and H. R. 6733 (Mrs. Hansen) introduced in the House May 1; H. R. 6892 (Colmer), introduced in House May 8; all to the Committee on Merchant Marine and Fisheries.

**SEAMEN'S PHYSICAL REQUIREMENTS:** H. R. 6972 (Bonner), introduced in House on May 10, a bill to encourage and promote safety in the merchant marine by requiring that seamen on vessels of the United States meet certain physical requirements; to the Committee on Merchant Marine and Fisheries. Would direct the Secretary of the Treasury, acting through the commandant of the Coast Guard, to establish physical qualifications for all positions on vessels of the United States.

**SHRIMP IMPORT DUTIES:** Introduced in House H. R. 6490 (Sikes) on April 19, and H. R. 6631 (Lane) on April 25, H. R. 6878 (Colmer) on May 8, bills to

amend the Tariff Act of 1930 to impose a duty on shrimp and to provide for duty-free entry of unprocessed shrimp annually in an amount equal to imports of shrimp in 1960; to the Committee on Ways and Means; similar to other bills on the same subject. Would make all imported shrimp that is processed in any way beyond the state of being a headless shell-on, vein-in shrimp subject to a duty of 35 percent ad valorem. Headless shell-on, vein-in shrimp imports, up to a quantity equal to 1960 imports, would enter the United States duty-free, but headless imports in excess of the quota would be dutiable at 35 percent. In the case of both processed imports and over-quota headless imports, the bills specifically provide that the duty will be 35 percent, but not less than 35 cents per pound.

The quota would be administered by the Secretary of the Interior, who is to allocate the duty-free quota among the countries supplying imports of shrimps to the United States in the calendar year 1960 in accordance with the volume of imports of shrimps received from each such country in that year. Another proviso is inserted in the bill to the effect that under the duty-free quota imports in any one month during the balance of the calendar year 1961 shall not exceed imports during the same month in the calendar year 1960.

The bills make it clear that products of American Fisheries (shrimp which have not been landed in a foreign country before entry into the United States, or which, if so landed, have been landed solely for transshipment without change in condition) would not be affected by the legislation.

**SUBMERGED LANDS ACT AMENDMENTS:** H. R. 6605 (Brooks of La.), introduced in the House on April 25, a bill to amend the Submerged Lands Act to establish the seaward boundaries of the States of Alabama, Mississippi, and Louisiana as extending three marine leagues into the Gulf of Mexico and providing for the ownership and use of the submerged lands, improvements, minerals, and natural resources within said boundaries; to the Committee on the Judiciary. Similar to other bills on the same subject.

**TARIFF NEGOTIATIONS:** Introduced in House: H. Con. Res. 231 (Harvey of Indiana) and H. Con. Res. 232 (Sikes) on May 2, H. Con. Res. 297 (Langden) on May 8, H. Con. Res. 299 (Forrester) and H. Con. Res. 300 (Jones) on May 10, H. Con. Res. 312 (Battin) on May 16, concurrent resolutions expressing the sense of Congress that the United States should not grant further tariff reductions in the present tariff negotiations under the provisions of the Trade Agreements Extension Act of 1958, and for other purposes; to Committee on Ways and Means. Also H. Con. Res. 304 (Bow), H. Con. Res. 305 (Fogarty), and H. Con. Res. 306 (Hiestand), introduced in House May 15.

**WATER POLLUTION CONTROL:** Committee on Public Works filed its report on April 25 in the House on H. R. 6441, a bill to amend the Federal Water Pollution Control Act to provide for a more effective program of water pollution control; with amendment (H. Rept. 306). Referred to the Committee of the Whole House on the State of the Union.

**Federal Water Pollution Control** (Hearings before the Committee on Public Works, House of Representatives, Eighty-Seventh Congress, First Session, March 14, 15, 16, and 29, 1961, on H. R. 4036), 354 pp., printed. Contains testimony of members of Congress, various

wildlife and sportfishing institutes, and other public officials and organizations. Also included are 2 appendices of the Michigan Water Resources Commission.

H. Rept. 306 Federal Water Pollution Control Act Amendments of 1961 (April 25, 1961, Report of the Committee of Public Works, House of Representatives, 87th Congress, 1st Session, to accompany H. R. 6441, a bill to amend the Federal Water Pollution Control Act to provide for a more effective program of water pollution control), 44 pp., printed. Contains purpose of bill, general statement, need for legislation, and minority views.

H. R. 6755 (Halpern), introduced in House May 2; to Committee on Public Works. Also, the House Committee on Rules granted an open rule, with 2 hours' debate, on H. R. 6441, on the same day. Four representatives from the House were witnesses testifying on granting of rule.

On May 3, by a record vote of 307 yeas to 110 nays, the House passed H. R. 6441. Prior to passage of bill a recommittal motion was rejected, an amendment pro-

viding for construction of a field laboratory and research facility in the Middle Atlantic area was adopted. In addition to rejecting amendments embodied in the recommittal motion, the House while in the Committee of the Whole rejected an amendment to delete the \$50 million increase in authorization for grants-in-aid in water pollution control.

Subcommittee on Flood Control--Rivers and Harbors of Senate Committee on Public Works on May 8 began hearings on several pending bills relating to the Federal Water Pollution Control Act and heard testimony from several Senators and Public Officials. Hearings were concluded on May 9.

WATER POLLUTION CONTROL RESEARCH LABORATORY: On April 20, a joint memorial was received from the 51st Legislative Assembly of the State of Oregon urging the President and Congress of the United States to pass legislation authorizing the establishment of a Pacific Northwest Pollution Control Laboratory by the U. S. Public Health Service.



#### AMAZONIAN FISHERMEN CATCH FISH WITH FEET, FINGERS

Ever try catching fish with your fingers? Or by imitating birds? Or by walking around in the mud? Primitive methods all, but they have one thing in common. They work. These and other unusual fishing techniques have been observed by a Food and Agriculture Organization fishery expert who has spent most of 1958-60 in the Amazonas, Brazil.

On the Amazon, Indian fishermen, whose razor-sharp reactions are yet not spoiled by civilization, actually catch fish with their hands. The men wade in the shallow water near the river banks and then thrust their hands into holes in the bank where certain kinds of fish breed. They catch the fish by touch.

The same fishermen utilize the greed of the tucanare, a tropical multi-colored perch, for kingfishers. The tucanare, weighing from 9 to 11 pounds, will eat a small duck or kingfisher, when they can get one. The fishermen imitate the noise of a kingfisher as it dives towards the water and then flick the water with a rod baited with a red rag and a hook on a three-inch line. The tucanare, attracted by the noise, jumps for the red rag and hook, thinking it is a kingfisher.

The Amazonian fisherman will also use his feet for fishing. This time his target is the amuré, a slender eel-shaped fish about a foot long that lives in mud and is used for bait. The fisherman's only equipment is a long pole, a cast net, and a box to collect the fish. He sinks one end of the pole into the mud under water 9 to 12 feet deep and then casts his net on the bottom. Diving down, he walks around the net's rim, the pressure of his feet forcing the fish out of the mud. Using the pole as a center, the fisherman works his way around it. He sells his catch to the bigger fisherman, so he does not need a boat. However, his nets rot within a year and must be replaced at a cost of between \$8 and \$10--a small fortune to the Indian fisherman.

Perhaps the most dangerous of these primitive fishing methods is an ancient ring-net technique, ancestor of today's purse-seining. Here men dive without any swimming apparatus into totally dark and muddy water 65 to 164 feet deep to join together the bottom of a large net. The men may become entangled in the net and drown or have their eardrums burst from the pressure. The divers begin at the age of 15 and if they survive are finished with diving at a maximum age of 25. Before the men dive, a fisherman using a sharpened rib of the Jarina palm frond, feels in the water for a school of fish near the surface. Finding the center of the school, he signals to two boats who cast their nets on either side of the school. The divers then go under and attach lines, closing the bottom of the net.

There is also the bow-and-arrow method or the harpoon. The Indians stand near shallow water and shoot or harpoon the fish.

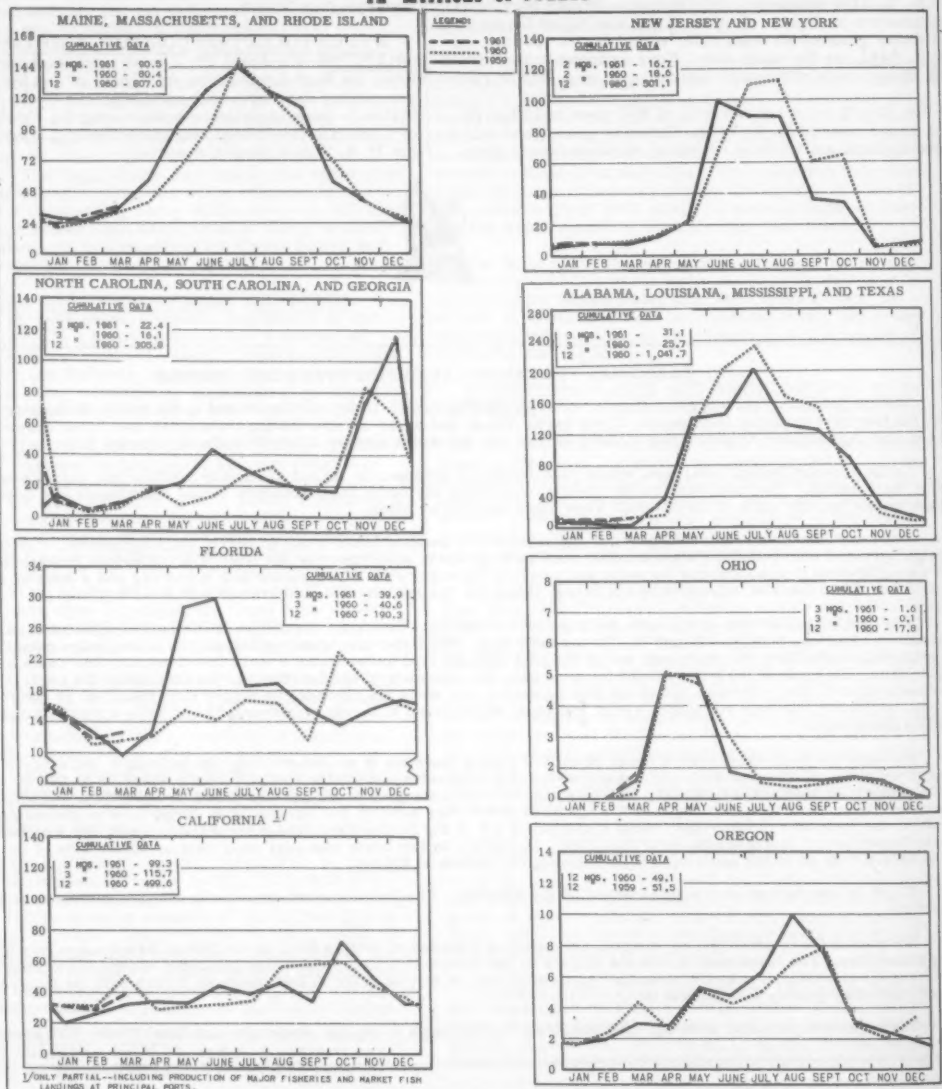
Not quite in the realm of fishing, but still employed as a means of getting food, is the Indian fisherman's way of catching crocodiles. The fisherman sticks his fingers in the crocodile's eyes, and wraps his arms around the reptile's jaws. He turns the crocodile over so that when the reptile surfaces, it will be belly up and unable to thrash with its tail. Awaiting fishermen then quickly disembowel it.

The primitive methods, although they yield fish, do not begin to tap the Amazon's rich fresh-water fish resources.

# FISHERY INDICATORS

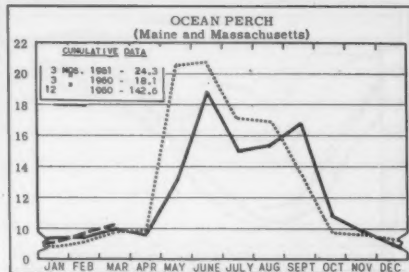
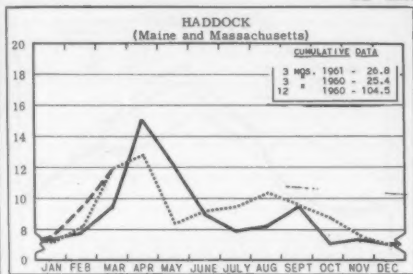
## CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

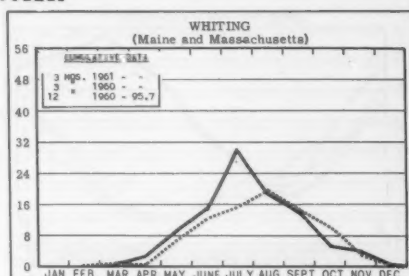
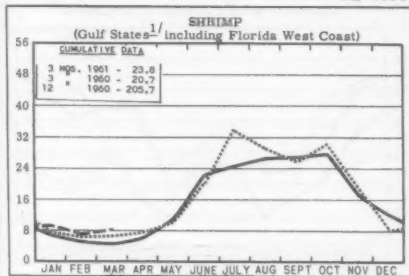


## CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

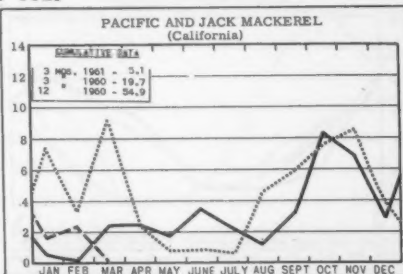
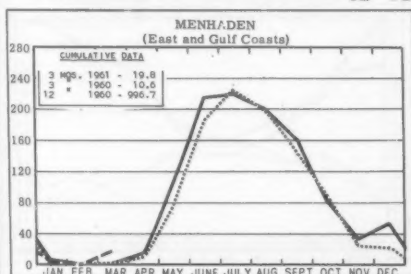


In Millions of Pounds

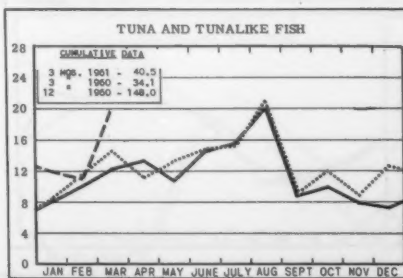
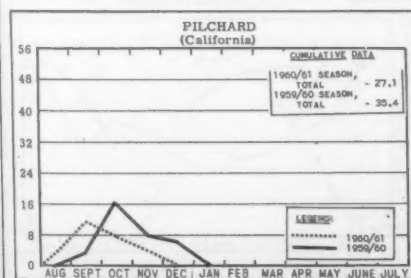


<sup>1/</sup>LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



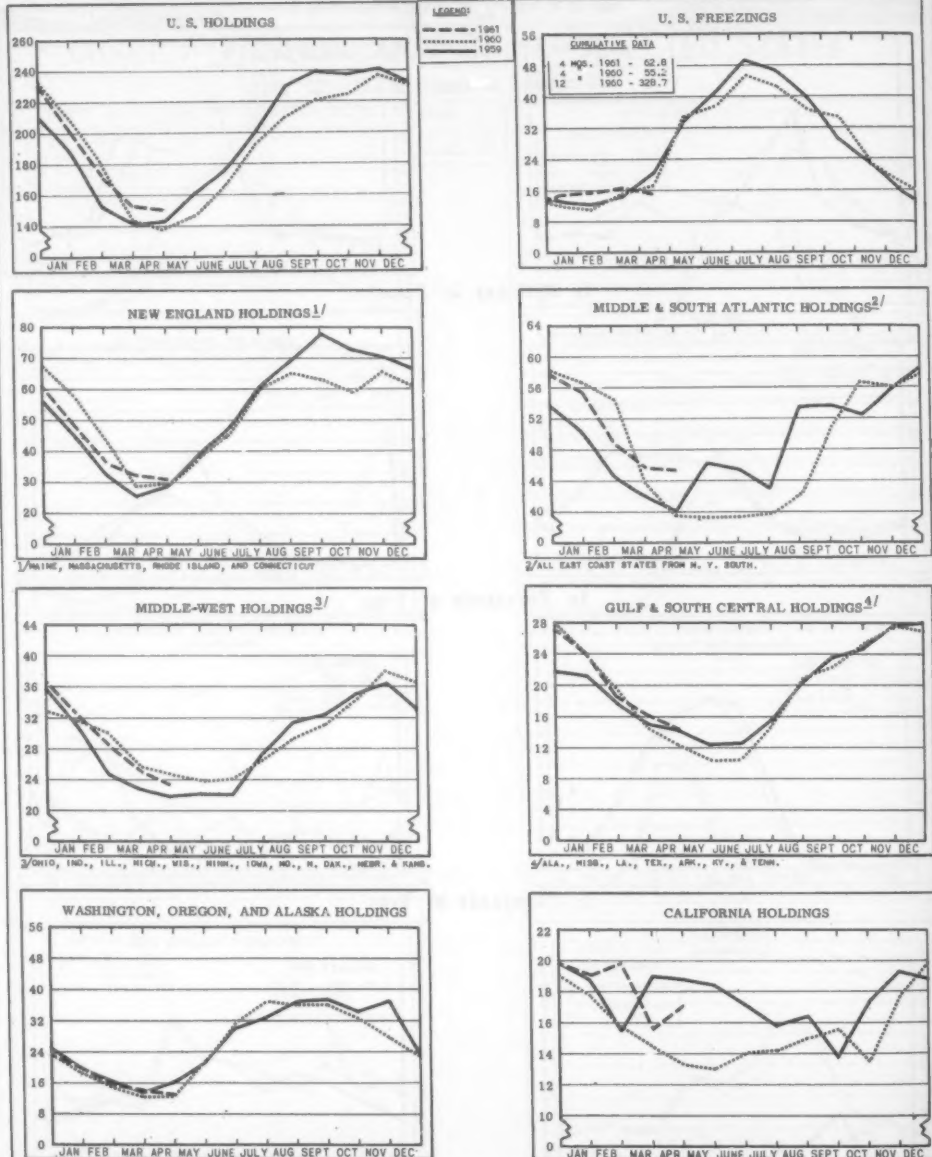
In Thousands of Tons





# CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

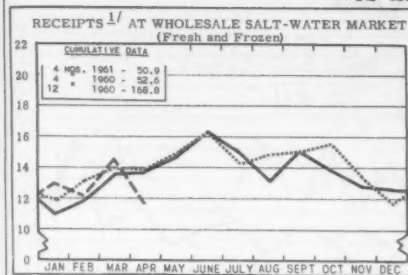
In Millions of Pounds



\* Excludes salted, cured, and smoked products.

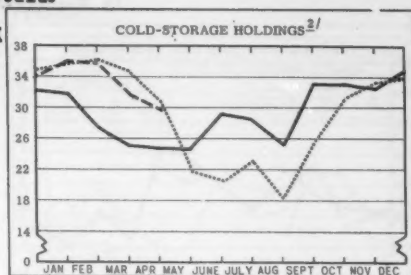
# **CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS**

In Millions of Pounds

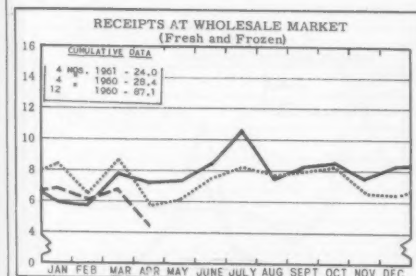


<sup>1/</sup>INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

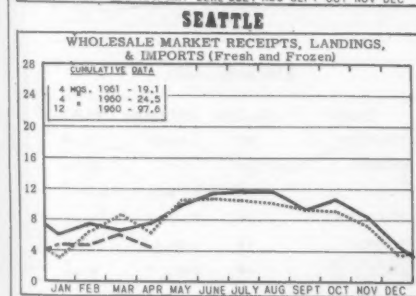
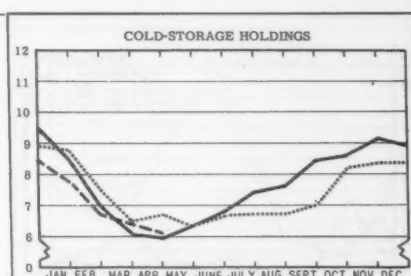
**NEW YORK CITY**



<sup>2/</sup>AS REPORTED BY PLANTS IN METROPOLITAN AREA.

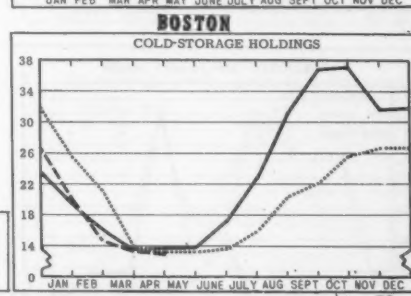


**CHICAGO**

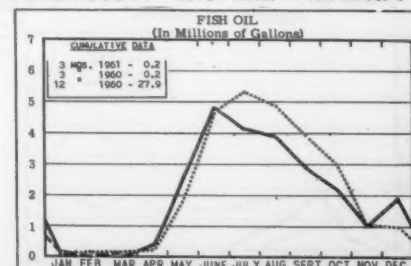
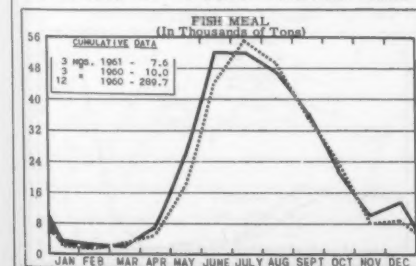


LEGEND:

--- 1961  
..... 1960  
—— 1959

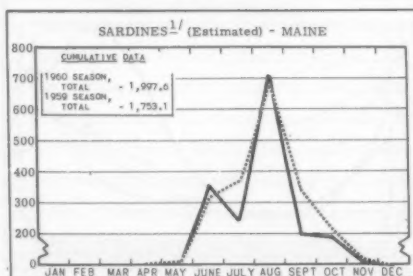
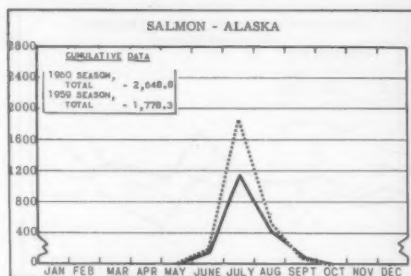
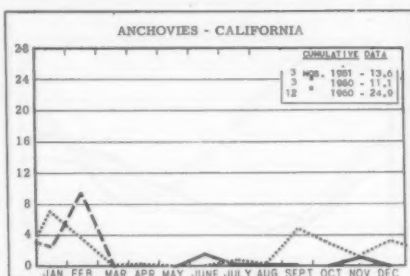
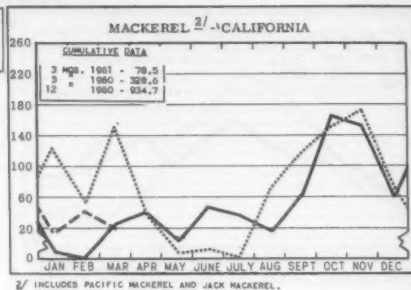
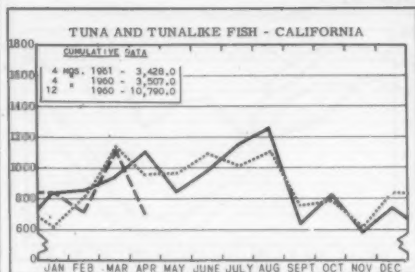


## **CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA**



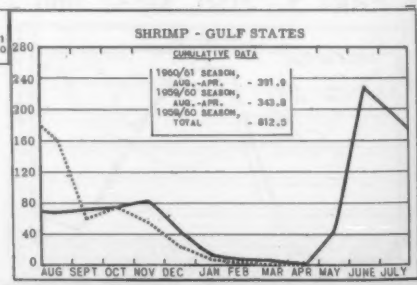
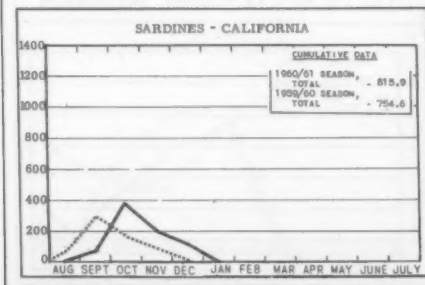
# CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



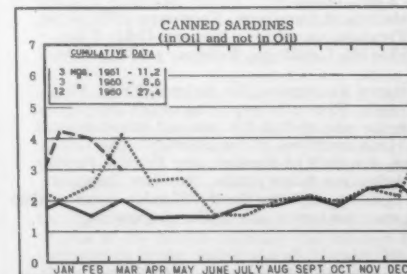
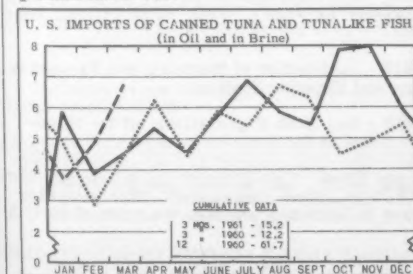
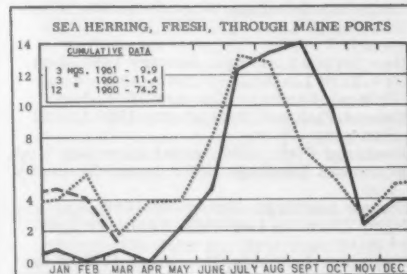
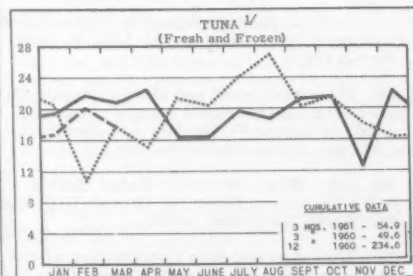
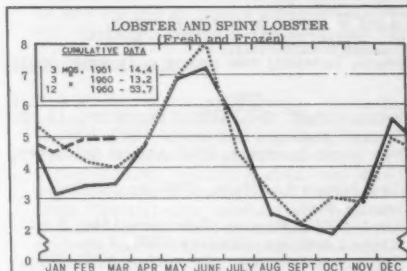
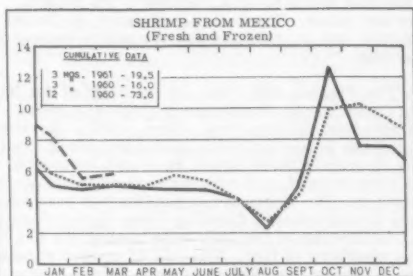
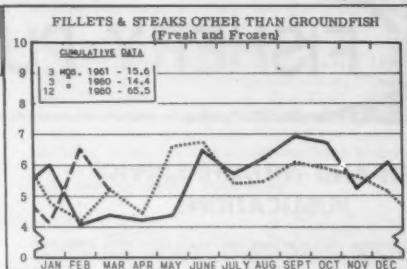
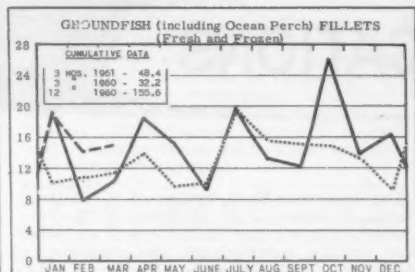
**STANDARD CASES**

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	1/2 drawn	3 1/2 oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# 1 tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	18 oz.
ANCHOVIES...	48	1/2-lb.	8 oz.

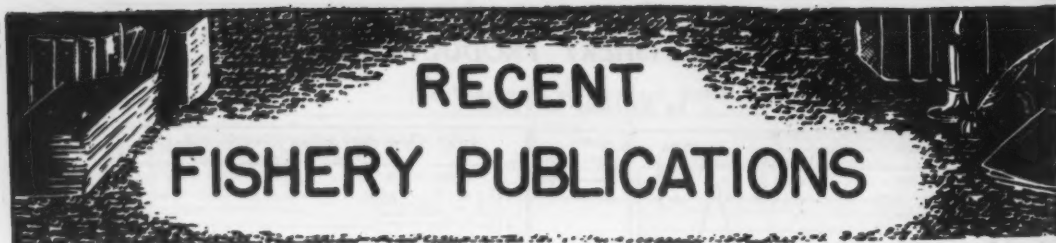


# CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds







## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE  
DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASH-  
INGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.  
FL - FISHERY LEAFLETS.  
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.  
SSR - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES  
(LIMITED DISTRIBUTION).  
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number   | Title   |
|----------|---|
| CFS-2495 | - Frozen Fish, 1960 Annual Summary, 14 pp.                |
| CFS-2514 | - Texas Landings, December 1960, 3 pp.                    |
| CFS-2520 | - New York Landings, 1960 Annual Summary, 9 pp.           |
| CFS-2527 | - New Jersey Landings, 1960 Annual Summary, 7 pp.         |
| CFS-2528 | - Frozen Fish Report, February 1961, 8 pp.                |
| CFS-2530 | - Maine Landings, January 1961, 3 pp.                     |
| CFS-2531 | - California Landings, November 1960, 5 pp.               |
| CFS-2532 | - Virginia Landings, 1960 Annual Summary, 8 pp.           |
| CFS-2533 | - Louisiana Landings, November 1960, 2 pp.                |
| CFS-2534 | - Washington Landings, 1960 Annual Summary, 2 pp.         |
| CFS-2535 | - New Jersey Landings, January 1961, 3 pp.                |
| CFS-2536 | - New York Landings, January 1961, 4 pp.                  |
| CFS-2540 | - Michigan Landings, January 1961, 2 pp.                  |
| CFS-2541 | - Canned Fish and Byproducts, 1960 Annual Summary, 21 pp. |
| CFS-2542 | - Packaged Fish, 1960 Annual Summary, 5 pp.               |
| CFS-2543 | - Minnesota Landings, 1960 Annual Summary, 2 pp.          |
| CFS-2544 | - Shrimp Landings, November 1960, 6 pp.                   |
| CFS-2546 | - North Carolina Landings, February 1961, 4 pp.           |
| CFS-2547 | - Louisiana Landings, December 1960, 2 pp.                |
| CFS-2548 | - South Carolina Landings, February 1961, 2 pp.           |
| CFS-2550 | - Maryland Landings, February 1961, 3 pp.                 |
| CFS-2551 | - Virginia Landings, January 1961, 3 pp.                  |
| CFS-2559 | - Florida Landings, February 1961, 8 pp.                  |

FL-501 - Fishery Resources for Animal Food, 22 pp., illus., printed. Presents reprints of ten magazine articles on the use of fish for pet and other animal food in various sections of the country--the Great Lakes area, the Gulf of Mexico, the Pacific Northwest, the Arkansas farm ponds, the New England industrial fishery, and the South Atlantic coast. Also discusses various types and costs of trawling.

FL-504 - The American Shad, by Gerald B. Talbot, 7 pp., illus., February 1961 (Revision of FL-179, March 1946). Covers the life history of the American shad, decline, management, and economics of the fishery, and catch statistics. Formerly a fishery of major importance on the Atlantic Coast, the shad has now declined to a fraction of its former volume and value. The building of dams, pollution of streams, and overfishing are the major causes of this decline.

FL-506 - The Florida Red Tide, by the Staff of the Bureau of Commercial Fisheries Biological Laboratory, Galveston, Texas, 8 pp., illus., 1961. Reviews the outbreaks in recent years of the so-called "red tide" on Florida's West Coast, research conducted on this phenomenon, and measures used in an attempt to control it. The causative organism has been identified as a microscopic dinoflagellate, *Gymnodinium breve*. Outbreaks of red tide have caused the death of large numbers of fish. The use of copper sulphate, attempted during the 1959 outbreak, did not prove successful.

FL-509 - A List of the Fishery Bulletins of the United States Fish and Wildlife Service, by Lola T. Deep, 14 pp., March 1961.

SSR-Fish. No. 358 - Biological and Oceanographic Observations in the Central North Pacific July-September 1958, by James W. McGary and Joseph J. Graham, 112 pp., illus., December 1960.

SSR-Fish. No. 370 - Status of Fresh-Water Mussel Stocks in the Tennessee River, by George D. Scruggs, Jr., 44 pp., illus., December 1960.

SSR-Fish. No. 373 - Age and Size Composition of the Menhaden Catch Along the Atlantic Coast of the United States, 1957 (with a Brief Review of the Commercial Fishery), by Fred C. June, 42 pp., illus., January 1961.

Sep. No. 618 - Application of Steaming and Vacuum to Shucking and Cleaning Scallops.

Sep. No. 619 - Red Crab Explorations off the Northeastern Coast of the United States.

Conservation Notes - Our Commercial Fisheries, Circular 55, 6 pp., illus., processed. This pamphlet discusses in laymen's language the work of the U.S.

Bureau of Commercial Fisheries in conservation of our fishery resources. Covers some fishing terms such as "commercial," "sport," and "rough" fish; the knowledge needed to achieve the maximum sustainable yield; the fishery specialists and the tools they use to acquire this knowledge; and the gear and vessels used to land the United States catch.

Index of Fishery Technological Publications of the Fish and Wildlife Service and the Former Bureau of Fisheries, 1918-55, compiled by M. E. Stansby and Rosemary Schaffner, Circular 98, 239 pp., processed. This index lists and classifies, by subject and by author, publications printed during the period 1918 through 1955 that are of interest to persons in the field of fishery technology. Reports appearing in Government publications and in trade and scientific journals are included. In addition to the articles on strictly technological subjects, some articles on subjects in related fields have been listed. Fairly complete coverage has been made of the field of fishing vessels and gear.

The National Aquarium, Circular 93, 6 pp., illus., printed.

Progress in Sport Fishery Research, 1960, Circular 101, 98 pp., illus., processed, 1961. This report of sport fishery research progress for the calendar year 1960 reflects new program responsibilities, completion of many units of research, termination of one investigation, and greatly enhanced intra-agency and interagency cooperation and collaboration. Discusses accomplishments in research on fresh-water fish management, fish diseases, fish nutrition, fish cultural methods, and marine game fish. Also includes a list of publications and special reports issued during the year.

The United States Fish and Wildlife Service, Its Responsibilities and Functions, by Edna N. Safer, Circular 97, 48 pp., illus., processed. This booklet covers the Federal Government's role in wildlife conservation, origin of the U. S. Fish and Wildlife Service, and functions of the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife. The author states that "The goal of the Fish and Wildlife Service is to maintain our fish and wildlife resources at a level that will have the greatest economic, esthetic, and recreational value possible for all our citizens."

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-48	- Pakistan's Fisheries Statistical Report, 1959.
MNL-49	- The National Marketing Corporation (NAMARCO).

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

Annotated Bibliography of Unpublished Estuarine Research in the Gulf of Mexico, 1925-1959, edited by Philip A. Butler, Supplement I, 56 pp., processed, October 1960. (Biological Laboratory, U.S. Bureau of Commercial Fisheries, Gulf Breeze, Fla.)

California Fishery Products Monthly Summary, Part I--Fishery Products Production and Market Data,

February 1961, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish; pack of canned tuna, mackerel, and anchovies; market fish receipts at San Pedro-Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; for the month indicated.

California Fishery Market News Monthly Summary, Part II--Fishing Information, March 1961, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego 6, Calif.) Discusses the first sonar cruise by two San Diego Biological Laboratory scientists. Also contains sea-surface temperature charts, Eastern Pacific Ocean; and other pertinent data for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, March 1961, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, March 1961, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, March 1961, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, Lower Eastern Shore; and Chincoteague, the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

Imports of Fishery Products at New York, N. Y., 1960, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.)

New England Fisheries--Annual Summary, 1960, by John J. O'Brien, 50 pp. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the fish marketing trends and conditions at the principal New England fishery ports, and highlights of fisheries in other nearby areas. Covers food-fish landings by ports and species; industrial-fish landings and ex-vessel prices; fishing vessel news; imports; frozen fishery products; and the fish meal market. Also covers fishery landings and ex-vessel prices by months for ports of Boston, Gloucester, New Bedford, Provincetown, Woods Hole, Portland, Rockland, Point Judith, and Stonington; highlights of the fisheries of Canada, Norway, and Peru; and historical data of fisheries at principal New England ports.

New York City's Wholesale Fishery Trade--Monthly Summary for February 1961, 19 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

Seattle and Astoria--Landings, Receipts, and Value of Fishery Products, 1960, by Charles M. Reardon, 42 pp. (Available free from the Market News Service, U. S. Fish and Wildlife Service, Pier 42, South, Seattle 4, Wash.) Reviews Pacific Northwest fisheries trends and their effect upon Seattle fishery products receipts for 1960; halibut landings; carload and truckload shipments of fishery products from Seattle by months; imports of canned fishery products at Seattle; and names, classifications, and approximate standards as used on Seattle wholesale market. The Astoria section presents fisheries trends and products receipts for 1960; and landings and receipts of fishery products, by months, 1960. The report also contains a number of statistical tables on fresh and frozen salmon receipts at Seattle, halibut landings, ex-vessel landings by the otter-trawl fleet, and related data.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, March 1961, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oreg.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Companies Curing Fish by Salting or Pickling in the Great Lakes Area, 1 p., processed. (Regional Director, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Ann Arbor, Mich.)

Companies Smoking Fish in the Great Lakes Area, 4 pp., processed. (Regional Director, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Ann Arbor, Mich.)

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3830, HONOLULU, HAWAII.

Size Frequency of the Bigeye Tuna Caught in the Equatorial Pacific, by Mori Yukinawa, 7 pp., processed, March 1961. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 8, March 1958, pp. 22-30.)

Studies on the Yellowfin Tuna. I--Seasonal Differences of Size Composition in the Adjacent Waters of the West Carolines, by Yoichi Yabuta and Mori Yukinawa, 7 pp., processed, March 1961. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 5, February 1957, pp. 119-126.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Better Hunting and Fishing on Small Watershed Projects, Circular 100, 8 pp., illus., printed, 1960. Better public hunting and fishing can be achieved on small watershed projects through the use of the Government cost-sharing plan approved by Congress.

This circular explains the types of development which are eligible for Federal cost-sharing. These include enlarging floodwater detention reservoirs for fishing lakes or waterfowl management areas; enlarging reservoirs to permit release of water for downstream benefits to fish or game; construction of reservoirs solely for fish and wildlife purposes as an integral part of the watershed project; modification of structures to permit fish and wildlife management; construction of fish shelters and fish ladders; improvement of stream banks or stream channels for fishery purposes; and construction of water catchments in arid regions to provide water for quail or other wildlife during critical periods.

Embryological Stages in the Sea Lamprey and Effects of Temperature on Development, by George W. Piavis, Fishery Bulletin 182 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 61), 33 pp., illus., printed, 30 cents, 1961.

1960 Annual Report of the Secretary of the Interior (For the Fiscal Year Ended June 30, 1960), by Fred A. Seaton, 394 pp., illus., printed, \$1.50. U. S. Department of the Interior, Washington 25, D. C. The activities of the Department's bureaus and offices, including the United States Fish and Wildlife Service, are summarized in this report. Among others, the accomplishments of the Bureau of Commercial Fisheries are described. Activities discussed in detail are utilization of the commercial fishery resources; research in fishery biology (shellfisheries, anadromous, inland, and marine fisheries; and marine mammals); technological advances; marketing assistance; and foreign trade and economic studies. Also contains information on the Pribilof Islands fur-seal industry; the Columbia River fisheries program; statistical surveys and reports; financial assistance to the fisheries; and market information. A summary of the various activities of the Bureau of Sport Fisheries and Wildlife is also included.

"An Underwater Observation Chamber," by Julius Rockwell, Jr. and Sung Pal Chur, article, Progressive Fish-Culturist, vol. 21, no. 3, 1959, pp. 131-134, processed.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATIONS OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

### ADEN COLONY AND PROTECTORATE:

Aden, 1957 and 1958, 142 pp., illus., printed, 7s. 6d. (about US\$1.05). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England, 1961. Contains, among others, sections on the fisheries of Aden Colony and Aden Protectorate. Each section discusses briefly methods used in catching fish; organization, finance, and utilization of catches; marketing; events affecting production; and activities of the Fisheries Department. Included are statistical tables showing fish landings during 1957 and 1958.

### ALASKA:

1958 Annual Report, Report No. 10, 120 pp., illus., printed, Alaska Department of Fish and Game, Juneau, Alaska. Covers the activities of the Alaska Fish and Game Commission and Department of Fish and Game during the calendar year 1958. Includes,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

among others, sections on accomplishments in biological research and in the commercial fisheries in the four fisheries districts. Fisheries work was concerned principally with management of the salmon stocks but attention was also given to the growing shrimp and king crab industries.

#### ALGAE:

Ecology and Distribution of Marine Algae Found in Tampa Bay, Boca Ciega Bay and at Tarpon Springs, Florida, by Ronald C. Phillips, 39 pp., illus., printed. (Reprinted from *The Quarterly Journal of the Florida Academy of Sciences*, vol. 23, no. 3, September 1960, pp. 222-260.) Director, Florida State Board of Conservation, W. V. Knott Bldg., Tallahassee, Fla.

Selected Bibliography on Algae, Number Five, edited by Joann Morris and E. L. Anderson, 223 pp., processed, C\$1. Nova Scotia Research Foundation Library, P. O. Box 1027, Halifax, Nova Scotia, Canada, 1960. This edition continues the series started by the Nova Scotia Research Foundation in 1952 when it issued a short bibliography on the utilization of seaweed to assist the Foundation's research workers and certain industrial organizations interested in this field. Most of the references are made to articles which appeared in 1957-58, but some earlier papers are listed as well.

#### ANGOLA:

Alguns Elementos para o Estudo da Captura Diferencial de Artes de Pesca em Angola (Some Elements for the Study of Different Methods of Capture in the Fisheries of Angola), by R. Monteiro, *Notas Mimeografadas do Centro de Biologia Piscatoria* No. 10, 11 pp., illus., processed in Portuguese. Centro de Biologia Piscatoria, Ministerio do Ultramar, Junta de Investigacoes do Ultramar, Lisbon, Portugal, 1960.

#### ARGENTINA:

La Pesca Maritima en la Argentina: Pasado, Presente, Porvenir (The Argentine Marine Fishery: Past, Present, Future), by Carlos H. Engelbeen, 213 pp., illus., printed in Spanish. Editorial Sudamericana, S. A., Calle Alsina 500, Buenos Aires, 1955.

#### ATOMIC ENERGY COMMISSION:

Marine Sciences Research in the AEC, TID-4040, 41 pp., processed, 50 cents. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. This booklet on marine sciences is one in a series of such publications in preparation to describe the research supported by the Division of Biology and Medicine, U. S. Atomic Energy Commission. Its purpose is to acquaint interested scientists with the biomedical program of the Commission, its objectives, and needs. The report discusses the marine sciences information needed by the Commission to carry out its responsibilities and outlines briefly the 28 marine research contracts being carried out at present.

#### AUSTRALIA:

Fishing and Whaling, 1959-60, Statistical Bulletin No. 6, 20 pp., illus., processed. Commonwealth Bureau of Census and Statistics, Canberra, Australia, March 7, 1961. This is the sixth of a series of annual bulletins dealing with the fishing and whaling industries in Australia. The statistics, covering quantity and value of catch and related

data, pertain to the year 1959-60 for general fisheries, and to the 1959 season for pearl-shell and trochus-shell fisheries, and to the 1960 season for whaling, with comparative data for the previous 4 years. The bulletin is divided into 4 parts. Part I deals with general fisheries including those for fish, crustaceans, and molluscs (edible products). Part II includes fisheries for pearl-shell and trochus-shell (inedible products). Part III covers the operation of the whaling industry in Australia and Norfolk Island. Part IV shows particulars of overseas trade in fishery and whaling products.

#### BIOCHEMISTRY:

"Phenol Oxidase in Shrimp and Crab," by M. E. Bailey, E. A. Fieger, and A. F. Novak, article, *Food Research*, vol. 25, September-October 1960, pp. 565-572, printed. Food Research, The Garrard Press, 510 No. Hickory St., Champaign, Ill.

#### BRITISH GUIANA:

Survey of Fisheries Developments in British Guiana, April 3-June 3, 1960, by Charles L. Kaufmann, 34 pp., illus., processed. United States Operations Mission, U. S. Consulate, Georgetown, British Guiana, June 1960.

#### BYPRODUCTS:

"Chick Growth Response to Fish By-Products and Arsanilic Acid," by E. L. Wisman, article, *Poultry Science*, vol. 39, September 1960, pp. 1140-1148, printed. Poultry Science, Poultry Science Association, Kansas State College, Manhattan, Kans.

Enzymic Treatment of Autolyzed Fishes or Fish Entrails, by Shunro Takei, Japanese Patent #2840, 1958, printed in Japanese. Tokkyoko, No. 1 San-nencho, Kojimachiku Tokyo, Japan.

Fish Meal and Fish-Processing Water, by Edgar Haase, Helmuth Nolte, and Lothar Reinhardt, German Patent #1,034,005, printed in German. German Patent Office, Bonn, West Germany.

#### CANADA:

Annual Report of the Fisheries Research Board of Canada, 1959/60 (For the Fiscal Year Ended March 31, 1960), 196 pp., illus., printed in English with additional introduction in French, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1961. A comprehensive summary of the work of the Fisheries Research Board of Canada and its field stations during 1959/60. As prescribed by a special Act of Parliament "the Board has charge of all Dominion fishery research stations in Canada, and has the conduct and control of investigations of practical and economic problems connected with marine and fresh-water fisheries, flora and fauna and such other work as may be assigned to it by the Minister." The work of the Board is organized in three closely coordinated fields: biological, technological, and oceanographic. During 1959, the 177-foot trawler-type research vessel A. T. Cameron satisfactorily completed its first full year of operation; a new laboratory was completed in Vancouver, B. C.; an extensive new wing on the biological laboratory in St. Andrews, N. B., was opened; and the new 36-foot vessel *Salvelinus* for research in the western Arctic was completed and delivered to the mouth of the Mackenzie River in readiness for the



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

next field season. The report also covers activities at the Biological Stations, St. John's, Newfoundland, St. Andrews, New Brunswick, London, Ontario, and Nanaimo, B. C.; the Arctic Unit, Montreal, Quebec; and the Technological Stations, Halifax, Nova Scotia, Grande-Riviere, Quebec, Vancouver, B. C., and London, Ontario. A list of the publications and reports published during the year by the Board is included.

"Canada's Fisheries Markets in 1960," by T. R. Kinsella, article, *Foreign Trade*, vol. 115, no. 7, April 8, 1961, pp. 2-7, illus., printed. Queen's Printer and Controller of Stationery, Government Printing Bureau, Ottawa, Canada. Discusses the volume and value of the catch in the Atlantic, Pacific, and inland fisheries. Also discusses foreign trade in fishery products; the markets for fresh and frozen, salted, and canned fish, and molluscs and crustaceans; fish meal and oil production and markets; and trade fairs and conferences concerned with the fishery industries.

Fisheries Council of Canada, Annual Review, 1961, 76 pp., illus., printed. Fisheries Council of Canada, Rm. 703, 77 Metcalfe St., Ottawa 4, Canada. Contains, among others, the following articles: "Commercial Fishing in Ontario," by W. H. R. Werner; "Freshwater Fisheries Research," by W. A. Kennedy; "The Significance of Some New Gear Developments," by Brian I. Meagher; "FAO International Fish Meal Meeting;" and "Canada's Fisheries in 1960," by W. C. MacKenzie.

#### CAPE VERDE ISLANDS:

*Sobre a Pesca do Atum em Cabo Verde (On the Tuna Fishery in the Cape Verdes)*, by F. Correia da Costa, *Notas Mimeografadas do Centro de Biologia Piscatoria* no. 7, 19 pp., illus., processed in Portuguese. Centro de Biologia Piscatoria, Ministerio do Ultramar, Junta de Investigacoes do Ultramar, Lisbon, Portugal, 1960.

#### COD:

"Changes in the Actin of Cod Flesh during Storage at -14°," by J. J. Connell, article, *Journal of the Science of Food and Agriculture*, vol. 11, September 1960, pp. 515-519, printed. *Journal of the Science of Food and Agriculture*, The Society of Chemical Industry, 14 Belgrave Square, London SW1, England.

*Cod Catches in the Bay of Gdansk in 1949-1953 in the Aspect of Hydrographic and Climatic Factors*, OTS 60-21520, 20 pp., illus., processed, 50 cents. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1960. (Translated from *Prace Morskiego Instytutu Rybackiego*, no. 9, 1957, pp. 79-102.)

#### COMMISSIONS:

(Atlantic States Marine Fisheries Commission) Minutes of the 19th Annual Meeting (September 29, 30, 1960, Charleston, S. C.), 206 pp., processed, limited distribution. Atlantic States Marine Fisheries Commission, 22 W. First St., Mount Vernon, N. Y. Covers the minutes of the 19th annual meeting of the Commission with details of attendance; the first, second, and third general sessions; and section meetings of the North Atlantic, Middle Atlantic, Chesapeake Bay, and South Atlantic Sections. Also

includes accounts of the individual section meetings, resolutions recommended for adoption, and the executive committee meeting. Appendices include, among others, reports on research work accomplished by the Commission and its sponsoring agency, the U. S. Fish and Wildlife Service. Also included in the appendices are reports on status of oyster mortalities in Delaware and Chesapeake Bays; current situation in fisheries of the Atlantic Bight; the continuing threat of pesticides; FAO-sponsored International Conference on Fish in Nutrition; fishery statistical programs; particular biological research on menhaden currently needed by the industry; plans for sport fishery research on the Atlantic Coast; and a prospectus for marine game fish research, Bureau of Sport Fisheries and Wildlife.

(Atlantic States Marine Fisheries Commission) *Nineteenth Annual Report* (to the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 55 pp., printed. Atlantic States Marine Fisheries Commission, 22 W. First St., Mount Vernon, N. Y., March 1961. Summarizes briefly the many activities of the Atlantic States Marine Fisheries Commission during 1960. Includes condensed reports of the work of the Commission and of the basic committees—legal, technological, biological, and executive. Also contains reports from the North Atlantic Section on the starfish invasion of Long Island Sound, proposed lobster research program, size limit on lobsters, whiting research, shellfish inventory, and need for state mesh regulations in inshore waters. The Middle Atlantic Section reports on pesticides, fresh-water runoff in estuaries, oyster mortalities, criteria for artificial reef construction, scup studies, surf clam exploration, the need to undertake further menhaden studies, and offshore lobster production. The Chesapeake Bay Section discusses blue crab project, oyster mortalities, oyster drill control, and the Potomac River Compact between Maryland and Virginia. The South Atlantic Section reports on the Southeast River Basin study, licensing out-of-state shrimp boats, exploratory fishing along the South Atlantic Coast, and blue crab research. Appendices include State legislation recommended; biological subcommittee reports on striped bass experiment, blue crab, and fisheries of the Atlantic Bight; and resolutions adopted by the Commission.

#### CRABS:

*Marine Crabs of Bombay State*, by B. F. Chhapgar, 94 pp., illus., printed. Taraporevala Marine Biological Station, Department of Fisheries, Bombay 2, India, 1957.

#### CRUSTACEANS:

"Painless Killing of Crabs and Other Large Crustaceans," by Gordon Gunter, article, *Science*, vol. 133, no. 3449, February 3, 1961, p. 327, printed. *Science*, 1515 Massachusetts Ave., NW., Washington 5, D. C. Large crustaceans used for food are customarily scalded to death. This is unnecessary torture, according to the author, for it can be avoided easily. It is possible to kill the animals quickly, without pain, by placing them in cool fresh water and raising the temperature steadily to about 40° C. (104° F.).

#### DOLPHINS:

"On the Identification, Distribution, and Biology of the Dolphins, *Coryphaena hippurus* and *C. equiselis*," by

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Robert H. Gibbs, Jr. and Bruce B. Collette, article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 9, no. 2, 1959, pp. 118-152, printed. Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla.

#### ENZYMES:

"Physico-Chemical Properties of the Enzymes Involved in Shrimp Melanogenesis," by M. E. Bailey, E. A. Fieger, and A. F. Novak, article, Food Research, vol. 25, September-October 1960, pp. 557-564, printed. Food Research, The Garrard Press, 510 No. Hickory St., Champaign, Ill.

#### FEEDS:

"Limits to Value of Chemical Analysis in Appraising Feeds," by Joseph Kastelic, article, The Feed Bag, vol. 36, February 1960, pp. 53, 56, printed. The Feed Bag, Editorial Service Company, 1712 W. St. Paul Ave., Milwaukee 3, Wis.

#### FISH-LIVER OIL:

"Biological and Chemical Estimation of Vitamin D in Shark-Liver Oil," by S. K. Pradhan and N. G. Magar, article, Indian Journal of Medical Research, vol. 45, 1957, pp. 49-53, printed. Indian Journal of Medical Research, Job Press Private Ltd., P. O. Box 124, Cawnpore, India.

#### FISH LIVERS:

"Fish Liver Paste," by A. Guttman, article, Trade News, vol. 13, no. 8, February 1961, pp. 6-7, processed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. Discusses the work accomplished at the Halifax, N. S., Technological Station of the Fisheries Research Board of Canada on the preparation of fish-liver paste. Its nutritive value is described and a method is outlined for preparation of the paste from cod and haddock livers.

#### FISH MEAL:

"Chemical and Nutritional Changes in Stored Herring Meal," by C. H. Lea, L. J. Parr, and K. J. Carpenter, article, British Journal of Nutrition, vol. 14, 1960, pp. 91-113, printed. British Journal of Nutrition, Cambridge University Press, 32 E. 57th St., New York 22, N. Y.

"A Comparison of Dried Skim Milk and White-Fish Meal as Supplements for Fattening Pigs. IV--Further Studies with Pigs Fed Unrestricted Amounts of Whey under Commercial Conditions," by R. Braude and others, article, Journal of Dairy Research, vol. 26, 1959, pp. 238-247, printed. Journal of Dairy Research, Cambridge University Press, 200 Euston Rd., London NW1, England.

The Smell Problem in Herring-Meal Factories, by J. A. Lovern and June Olley, 3 pp., illus., printed. (Reprinted from the Journal of the Science of Food and Agriculture, vol. 5, no. 10, October 1954, pp. 466-468.) Journal of the Science of Food and Agriculture, Society of Chemical Industry, 14 Belgrave Square, London SW1, England.

#### FISH SOLUBLES:

"Ineffectiveness of Antibiotic Combination on Response of Chicks Fed Fish Solubles," by H. Menge

and Robert J. Lillie, article, Poultry Science, vol. 39, September 1960, pp. 1188-1190, printed. Poultry Science, Poultry Science Association, Kansas State College, Manhattan, Kans.

#### FISHERIES RESEARCH:

Catalog of Publications of the Institute for Fisheries Research, 1934-1957, 24 pp., processed. Institute for Fisheries Research, University Museums Annex, Ann Arbor, Mich. Lists the publications of the Institute for Fisheries Research. The specific problems undertaken by the Institute include further research into the methods and value of stream and lake improvement; inventory of the streams and inland lakes to determine suitable management methods; studies of migration, growth rate, food habits, spawning habits and other relationships of the principal game and forage fish; predator studies; evaluation of fishing regulations; population studies; and determination of fish yield by creel census. Research in fish nutrition and diseases is also being conducted to improve the efficiency of the hatcheries. Also includes a supplementary list of publications of the Institute, 1958-59.

#### FISHING LIMITS:

"Icelandic Dispute Ends," article, Fish Trades Gazette, no. 4056, March 18, 1961, pp. 9-10, printed. Retail Journals Limited, John Adam House, John Adam St., London WC2, England. The formal exchange of notes between the Icelandic Foreign Minister and the British Ambassador in Reykjavik officially concluded the settlement of the dispute on fishery limits between the two countries. The Icelandic Government announced that all charges against British trawlers for illegal fishing in Icelandic waters were to be withdrawn. This brings to a close 13 years of protracted negotiations between the two countries.

#### FLORIDA:

(Florida State Board of Conservation) Fourteenth Biennial Report, 1959-1960, 74 pp., illus., printed. Florida State Board of Conservation, Tallahassee, Fla., March 1961. Describes the activities of the Florida State Board of Conservation during 1959-60, summarizing the goals attained and progress achieved in the betterment of salt-water conservation. Includes chapters on conservation, administration of the Conservation Department, research, oyster culture, enforcement, and commercial fisheries statistics. According to the report, the most serious problem facing salt-water conservation in Florida today is the destruction of sanctuaries and nursery areas by the improvident management of shallow water embayments and river mouths. Two types of damage predominate: pollution and dredging and filling. Florida showed a rapidly accelerating increase in oyster production during the biennium. A program of clam research revealed vast potentialities in this field. The discovery of additional offshore sources of the calico scallop indicate future increases in production. Mullet remained a problem as demand and price declined. Increased interest in the creation of offshore fishing reefs prompted the establishment of rules and procedures for such activity.

A Report on the Hydrography, Marine Plants, and Fishes of the Caloosahatchee River Area, Lee County, Florida, by Ronald C. Phillips and Victor G. Springer, Special Scientific Report No. 5, 34 pp., illus., proc-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

essed. Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla., December 1, 1960.

#### FOOD AND AGRICULTURE ORGANIZATION:

World Fisheries Abstracts, List of Periodicals Searched as at 31 December 1959, Supplement to vol. 11, no. 1, 74 pp., printed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A list of periodicals which are searched regularly as source material for the World Fisheries Abstracts. The present list contains the address of each periodical and is complete as of December 31, 1959. The periodicals are arranged alphabetically by name. To assist the readers, a trilingual list of the terms commonly used in describing the data in respect of frequency of publication is included.

#### FOREIGN TRADE:

Comprehensive Export Schedule (and supplementary Current Export Bulletins), processed, \$6, domestic, and \$7.50, foreign, for subscription year April 1, 1961, to March 31, 1962. Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C., April 1, 1961. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A compilation of official regulations and policies governing the export licensing of commercial shipments.

#### FREEZERSHIP:

"El Atunero Congelador L'Africain" (The Tuna Freezer L'Africain), by Maurice Victor, article, Puntal, vol. 8, no. 3, February 1961, pp. 6-7, illus., printed in Spanish. Puntal, Apartado de Correos 316, Alicante, Spain.

#### FREEZING:

"Some Economics on Liquid Nitrogen for Tomorrow's Frozen Foods," article, Industrial Refrigeration, October 1960, pp. 15, 25, printed. Industrial Refrigeration, Nickerson & Collins Co., 433-435 N. Waller Ave., Chicago, Ill.

#### GENERAL:

A Dictionary of Fishes, Second Edition, by Rube Allyn, 111 pp., illus., printed. The Great Outdoors Association, Pier 63, Central Basin, St. Petersburg, Fla., 1951.

Science on the Shores and Banks, by Elizabeth K. Cooper, illus., printed, \$3.25. Harcourt, Brace and Company, Inc., 383 Madison Ave., New York 17, N. Y., 1960. A field book for young readers on the smaller plants and animals to be found in or near fresh or salt water or in swamps. Discusses what to look for, the equipment and methods needed to observe and to collect specimens, how to make and maintain an aquarium or underwater garden, how to explore a tide pool, and how to identify and collect shells. Describes the different kinds of mollusks; starfish and their relatives such as sea urchins, sand dollars, and sea cucumbers; water worms; various crustaceans from lobsters to barnacles; frogs and other amphibians; lizards, snakes, turtles, and crocodiles; assorted fish; and seaweeds and fresh-water plants.

"Some Problems for Biological Fishery Survey and Techniques for Their Solution. A Symposium Held at Biarritz, France, March 1-10, 1956," by Lionel Walford, article, International Commission for the Northwest Atlantic Fisheries, Special Publication, vol. 1, 1956, pp. 1-339, illus., printed. International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada.

#### GERMANY:

Die Ernährungsindustrie Jahres-Fisch-Fachheft 1960 (The Food Industry Fishery Yearbook 1960), 74 pp., illus., printed in German. Industrieverlag von Hermann, Kg. Berlin W15, Germany.

#### GREAT LAKES:

Great Lakes Fisheries, by Spencer M. Bower, Fish Division Pamphlet No. 11, October 1953, 4 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 13, Mich.

#### GROUND FISH:

A Study of Annual and Seasonal Bathymetric Catch Patterns for Commercially Important Groundfishes of the Pacific Northwest Coast of North America, by Dayton L. Alverson, Bulletin 4, 67 pp., illus., printed. Pacific Marine Fisheries Commission, 741 State Office Bldg., 1400 SW Fifth Ave., Portland 1, Ore., 1960.

#### HERRING:

"The Fishery for Herring (*Clupea pallasii*) on Puget Sound," by Walter R. Williams, article, Fisheries Research Papers, vol. 2, no. 2, 1959, pp. 5-30, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

Lake Herring Recipes, Fish Division Pamphlet No. 5, June 1952, 6 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 13, Mich.

#### HONG KONG:

Hong Kong Annual Departmental Report by the Commissioner for Co-Operative Development for the Financial Year 1959-60, 47 pp., illus., printed, HK\$3.50 (about 61 U. S. cents). Government Press, Java Road, Hong Kong. Discusses the cooperative societies, credit facilities, and marketing organizations provided in the Colony for the fishermen and farmers. The section covering the Government-sponsored Fish Marketing Organization includes information on legislation, species of fish marketed, the mechanized fishing fleet, and wholesale markets. Also discusses the marketing of shrimp, transportation of fish, education of fishermen and their children, and financial assistance to fishermen.

#### INDIA:

Annual Report of the Department of Fisheries Bombay State (1958-59), 71 pp., illus., printed, 2s. 9d. (about 40 U. S. cents). High Commissioner for India, India House, Aldwych, London WC2, England, 1960.

#### INTERNATIONAL COMMISSIONS:

International Commission for the Northwest Atlantic Fisheries, Annual Proceedings for the Year 1959-60, vol. 10, 122 pp., illus., printed. International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada, 1960. Presents the Commission's

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

administrative report for the year ending June 30, 1960, including financial statements; a report of the Tenth Annual Meeting, May 30-June 3, 1960; summaries of research during 1959 broken down by countries; and a compilation of research reports by subareas for 1959. Also contains the following selected research paper from the 1960 Annual Meeting: "ICNAF Mesh Regulations, Operation of 10% Annual Exemption, Oct. 1, 1957, through September 30, 1959," by Lawrence H. Couture.

(International North Pacific Fisheries Commission), Proceedings of the Seventh Annual Meeting, 1960 (Vancouver, B. C., November 7-11, 1960), 284 pp., processed. International North Pacific Fisheries Commission, University of British Columbia, Vancouver 8, B. C., Canada, March 10, 1961. Covers the agenda, list of participants, minutes of sessions, and committee reports for the seventh annual meeting of the Commission. The appendixes present, among others, subcommittee reports on distribution of sockeye, pink, and chum salmon; oceanographic studies; king crab research; distribution and relative abundance of Pacific salmon on the high seas; methods of analysis used in racial studies; and long-range research planning by the member countries--United States, Canada, and Japan.

#### ITALY:

Proposed Program for Increasing the Production of Fishery Products in the Mediterranean Basin, Part I--The Fisheries of Italy, 90 pp., illus., processed. U. S. Department of State, Washington 25, D. C., November 1943.

#### INTERIOR DEPARTMENT:

Publications of the United States Department of the Interior, 23 pp., printed. Division of Information, Department of the Interior, 1960. Lists the publications issued by the Department of the Interior through its various bureaus and offices. Among others, includes bulletins, periodicals, Circulars, Test Kitchen Series, and Statistical Digests of the Fish and Wildlife Service.

#### JAPAN:

Bulletin of the Hokkaido Regional Fisheries Research Laboratory, no. 22, September 1960, 86 pp., illus., printed in Japanese with English abstracts. Hokkaido Regional Fisheries Research Laboratory, Yoichi, Hokkaido, Japan. Includes, among others, articles on: "Increase in Size at Molting in Crustacea," by H. Kurata; "Food of Spring Herring (*Clupea pallasii* Cuvier et Valenciennes) in Hokkaido, Japan, 1949-53," by I. Takeuchi; and "The Investigation of Salmon on Shark as a Predator on Salmon in the North Pacific, 1959," by O. Sano.

Bulletin of Tokai Regional Fisheries Research Laboratory, no. 28, May 1960, 230 pp., illus., printed in Japanese with English summaries. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Includes the following articles: "Studies on the Dynamics and the Management of Fish Populations," by S. Tanaka; "Some Aspects in the Distribution of Fur-Seals in the North Pacific" (in English), by F. Nagasaki; "Abundance of Pups on the Pribilofs Estimated from Tag-Recoveries," by F. Nagasaki; and "Studies on Fluctuation of the Vitamin A Content in Fishes. IV--Vita-

min A and Lipids in Eel," by H. Higashi and others.

The Investigation of Demersal Fish Resources in the East China and the Yellow Seas. 4--A Progress Report of 1956, 115 pp., illus., printed in Japanese with English summary. Seikai Regional Fisheries Research Laboratory, Maruo-machi, Nagasaki, Japan, August 1957.

"List of Publications from the Department of Fisheries, Faculty of Agriculture, Kyoto University During the Period 1947-1957," article, Memoirs of the College of Agriculture, Kyoto University Fisheries Service, Special Number 1958, pp. 3-22, printed. College of Agriculture, Kyoto University, Kyoto, Japan.

#### KENTUCKY:

A Report on the Commercial Fish Harvest in Kentucky for 1959, by James P. Carter, Fisheries Bulletin #26, 13 pp., processed. Division of Fisheries, Department of Fish and Wildlife Resources, Frankfort, Ky., February 1961. Presents the results of a survey made to determine the value and extent of the commercial fishery of all lakes and streams open to commercial fishing in Kentucky during the period January 1, 1959, to December 31, 1959. Covers the number of fishermen and types of gear used, quantity of each species of fish landed and their values, total weight and value of fish taken from each river or lake and comparison of the 1959 survey with that of three previous years. Includes statistical tables showing amount of gear used and the total value and weight of fish harvested from each type of gear, total volume and value of each species landed, volume and value of fish by river or lake, and related data.

#### LAKE ERIE:

"Lake Erie Ice Fishing," by Donald J. Spittler, article, The Conservationist, vol. 15, no. 4, February-March 1961, p. 15, illus., printed. The Conservationist, Rm. 335, State Campus, Albany, N. Y. Discusses fishing through the ice on Lake Erie during the winter. An abundance of smelt and some pike and perch are to be had for the taking.

#### LAW OF THE SEA:

"The Law of the Sea Around Us," by Philip C. Jessup, article, The American Journal of International Law, vol. 55, no. 1, January 1961, pp. 104-109, printed. Executive Secretary, The American Society of International Law, 2223 Massachusetts Ave., NW., Washington 8, D. C.

#### MARINE AIDS:

List of Lights and Other Marine Aids, vol. I--Atlantic Coast, St. Croix River, Me., to Little River, S. C., Catalog No. T 47.52:v.1/961, 588 pp., illus., printed, \$3.25.

, vol. II--Atlantic and Gulf Coast, Little River, S. C. to Rio Grande, Tex., and the Antilles, Catalog No. T 47.52:v.2/961, 491 pp., illus., printed, \$3. These volumes list the lights and other marine aids to navigation maintained by or under authority of the U. S. Coast Guard on the Atlantic and Gulf Coasts of the United States, including the United States West Indies. The first volume covers the First, Third, and Fifth Coast Guard districts, and



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

the second volume covers the Seventh and Eighth Coast Guard districts.

, vol. III, Pacific Coast and Pacific Islands, Catalog No. T 47.52:v.3/961, 348 pp., illus., printed, \$2.25. Lists the lights and other marine aids to navigation maintained by or under authority of the U. S. Coast Guard on the Pacific Coast of the United States and Pacific Islands. For the convenience of mariners, there are also included the lighted aids, fog signals, and radiobeacons maintained by British Columbia which may be used by vessels proceeding directly from the United States to Alaska.

, vol. V, Mississippi River System, Catalog No. T 47.52:v.5/961, 288 pp., illus., printed, \$1.75. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Lists the lights and other marine aids to navigation maintained by or under authority of the U. S. Coast Guard on the Mississippi River System of the United States.

#### MARINE BIOLOGY:

"New World for Marine Biologists," by Willis E. Pequegnat, article, Natural History, vol. 70, no. 4, April 1961, pp. 8-17, illus., printed. Natural History, The American Museum of Natural History, Central Park W. at 79th St., New York 24, N. Y. Describes the findings of a group of biologists exploring with the aid of self-contained underwater breathing apparatus (SCUBA), the area from the line of the lowest tides to a depth of about 30 meters along the coast of southern California. Gives details of many of the crustaceans, sponges, hydroids, corals, and fishes found in the four zones into which the reefs were delineated.

#### MARYLAND:

Bibliography of Maryland Fisheries (Including Published and Unpublished Papers on the Fisheries and Related Fields of Tidewater Maryland), by Frank J. Schwartz, Contribution No. 144, 35 pp., printed. Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., June 1960.

#### MASSACHUSETTS:

Final Report on the Studies of Massachusetts Marine Fisheries Problems by the Marine Fisheries Advisory Commission, 90 pp., illus., processed. The Commonwealth of Massachusetts, Department of Natural Resources, 15 Ashburton Place, Boston 8, Mass., December 1960. This report is concerned with the marine fisheries of the territorial waters of Massachusetts and the economic and recreational value of these waters to its citizens. More than 5,000 fishermen derive their livelihood directly from these waters, and many more thousands are engaged in marketing, packaging, and distributing inshore fish products. The continued economic health of many of the coastal communities, and the welfare of many citizens, depend largely upon the ability of the inshore waters to produce seafood in sufficient quantities to sustain the economic or recreational interests of the many thousands of individuals concerned. The current productivity of the inshore waters is enormous.

#### MICHIGAN:

A List of References and Colored Pictures Useful for the Study of Michigan Fishes, Fish Division Pamphlet

No. 27, February 1959, 2 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 26, Mich.

Names of Michigan Fishes, Fish Division Pamphlet No. 22, January 1956, 5 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 26, Mich.

#### MINERALS:

"Minerals on the Ocean Floor," by John L. Mero, article, Scientific American, vol. 203, no. 6, December 1960, pp. 64-72, illus., printed. Scientific American, Inc., 415 Madison Ave., New York 17, N. Y. The depths of the ocean are strewn with curious nodules that are rich in manganese, copper, cobalt, and nickel. Special devices may make it possible to mine the bottom for these valuable substances.

#### MISCELLANEOUS:

Children of the Fishing Boats, by Michael Portland, 30 pp., illus., printed, \$2.50. Taplinger Publishing Co., Inc., 119 W. 57th St., New York 19, N. Y., 1961. Life in an Italian fishing village, for boys and girls.

#### MOTION PICTURES:

Film Catalog, 20 pp., printed. Division of Information, U. S. Department of the Interior, Washington 25, D.C. The motion pictures listed in this catalog are selected from the film libraries of the various bureaus and offices (including the Fish and Wildlife Service) of the Department of the Interior. They are available, on request, to educational institutions, industrial and agricultural training classes, engineering and professional societies, conservation organizations, civic and business associations, and other responsible public and private groups.

#### MOZAMBIQUE:

Panorama das Pescas em Mocambique (Survey of the Fisheries in Mozambique), by J. Goncalves Sanches, Notas Mimeografadas do Centro de Biologia Piscatoria No. 8, 6 pp., printed in Portuguese. Centro de Biologia Piscatoria, Ministerio do Ultramar, Junta de Investigações do Ultramar, Lisbon, Portugal, 1960.

#### NETS:

"Fishing Effect of Model Lift Nets, with Regard to Relation between Mesh Size and Fish Length," by Y. Hiyama, T. Kusaka, and Y. Yamashita, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 6/7, 1958, pp. 466-468, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

#### NORWAY:

Fiskerilitteratur 1954 (Fishery Literature 1954), by Margit Monstad, article, Vedkommende Norges Fiskerier 1954, no. 7, pp. 1-104, printed in Norwegian. Vedkommende Norges Fiskerier, A/S John Griegs Boktrykkeri, Bergen, Norway, 1958.

Investigations on Eggs and Larvae of Commercial Fishes in Norwegian Coastal and Offshore Waters in 1957-58, by Kristian Fredrik Wiborg, Report on Norwegian Fishery and Marine Investigations, vol. 12, no. 7, 1960, 24 pp., illus., printed. A/S John Griegs Boktrykkeri, Bergen, Norway.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Investigations on Pelagic Fry of Cod and Haddock in Coastal and Offshore Areas of Northern Norway in July-August 1957, by Kristian Fredrik Wiborg, Report on Norwegian Fishery and Marine Investigations, vol. 12, no. 8, 1960, 15 pp., illus., printed. A/S John Griegs Boktrykkeri, Bergen, Norway.

#### OCEANOGRAPHY:

A Manual of Sea Water Analysis, by J.D.H. Strickland and T.R. Parsons, 185 pp., printed, \$2, Fisheries Research Board of Canada, Ottawa, Canada. (For sale by Queen's Printer and Controller of Stationery, Ottawa, Canada.) Basic working instructions for analysis undertaking oceanographic chemical analyses.

Oceanic Observations of the Pacific, 1955, prepared by the Norpac Committee, 577 pp., illus., printed, \$10. University of California Press, Berkeley, Calif., 1960.

Oceanographic Data from Crawford Cruise 22 Trans-Atlantic Sections at Equator and 24° South for the International Geophysical Year of 1957-58, by W. G. Metcalf, Reference No. 60-3, 159 pp., illus., processed. Woods Hole Oceanographic Institution, Woods Hole, Mass., January 1960.

Oceanographic Data from Mediterranean Sea, Red Sea, Gulf of Aden and Indian Ocean, ATLANTIS Cruise 242 for the International Geophysical Year 1957-58, by A. Conrad Neumann and Dana Densmore, Reference No. 60-2, 45 pp., illus., processed. Woods Hole Oceanographic Institution, Woods Hole, Mass., December 1959.

Soundings, Bottom Profiles, and Deep Scattering Layer Observations, ATLANTIS Cruise 247, January-June 1959 for the International Geophysical Year of 1957-58, by Arthur R. Miller, Reference No. 60-15, 110 pp., illus., processed. Woods Hole Oceanographic Institution, Woods Hole, Mass., 1960.

#### OREGON:

Biennial Report to the Governor and the Fifty-First Legislative Assembly, 29 pp., illus., printed, limited distribution. Fish Commission of Oregon, 307 State Office Bldg., 1400 S.W. 5th Ave., Portland 1, Ore. Covers the work of the Oregon Fish Commission during the period July 1, 1958, to June 30, 1960. Discusses the accomplishments of the Research Division, including salmon fingerling marking, coastal river investigations, studies concerning the safeguarding of salmon spawning and rearing areas, tagging of ocean fish, albacore tuna investigations, and the Columbia River Fishery Development Program. Also discusses the Commission's work in fish culture, engineering, and development of water resources. Includes statistical tables showing liberations of salmon into Oregon streams, egg take at hatcheries, licenses issued, fish landings, and Bonneville fish count.

#### PACKAGING:

"Application of Colored Cellophane to Fish Products for the Purpose of Prolongation of Their Storage Life. I." by C. Koizumi and J. Nonaka, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, July 1959, pp. 204-211, printed in Japanese with English abstract. Japanese Society of Scientific

Fisheries, c/o Tokyo University of Fisheries, Shibakaidori 6-chome, Tokyo, Japan.

#### PLANT POISON:

"The Plant Poison 'Rotenone' and Its Importance for Fisheries," by J. Plomann, article, Deutsche Fischerei Zeitung, vol. 5, no. 1, 1958, pp. 22-25, printed in German. Deutsche Fischerei Zeitung, Berlin-Friedrichshagen. Muggelseedamm 310, East Berlin, Germany.

#### POLAND:

Basic Data on the Economy of Poland, by George W. Caldwell, Jr., WTIS, Part I, Economic Report No. 60-43, 20 pp., illus., printed, single copy 10 cents. U. S. Department of Commerce, Washington, D. C. September 1960. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A survey of the economy of Poland, including, among others, a short section on fisheries, covering landings of fresh- and salt-water fish, consumption, and Government development of the fisheries.

#### POLLUTION:

"The Importance of Biological Tests for the Protection of Rivers Against Pollution," by P. Vivier, article, General Fisheries Council of the Mediterranean, Proceedings and Technical Papers, no. 4, 1957, pp. 207-217, printed. Food and Agriculture Organization of the United Nations, General Fisheries Council for the Mediterranean, Rome, Italy.

#### PORPOISES:

Porpoises and Sonar, by Winthrop N. Kellogg, 177 pp., illus., printed, \$4.50. The University of Chicago Press, 5750 Ellis Ave., Chicago 37, Ill., 1961. Explains the working of the porpoise sonar system. Describes how, by means of numerous experimental studies, the author and other research workers analyzed the underwater noises of the porpoise, tested its hearing and auditory perception, found out how it navigates by echo-ranging, and how it can select food-fish whose echoes "sound appetizing." Also examined are ancient records of the dolphin, together with its intelligence, learning ability, brain structure, playfulness, and friendliness toward man. Contains new and original data never previously published.

#### POWER PROBLEMS:

"The Investigation of Fish-Power Problems," by P. A. Larkin, H. R. MacMillan Lectures in Fisheries, printed. Institute of Fisheries, University of British Columbia, Vancouver, B. C., Canada.

#### PREDATORS:

The Shellfish Predators of Massachusetts, by Harry J. Turner, Jr., 20 pp., illus., printed. Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Place, Boston, Mass.

#### PRESERVATION:

"Investigation of the Process of Acid Preservation of Fish and Fish Waste Products," by L. L. Lagunov and others, article, Trudy Vsesoiuznyi Nauchno-issledovatel'skii Institut Morskogo Rybnogo Khoz-iaistva i Okeanografii, vol. 35, 1958, pp. 115-130, printed in Russian. Vsesoiuznyi Nauchno-issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Okeanografi, Verkh. Krasnosel'skaia U1. No. 17, Moscow, U.S.S.R.

"A New Method of Preservation of Fish Waste and Inferior-Quality Fish," by M. E. Prakhin, article, *Biulleten' Nauchno-tehnicheskoi Informatsii Vsesoyuz. Nauchno-issledovatel'skii Institut Zhivotnovodstva*, No. 2, 1958, pp. 57-59, printed in Russian. *Nauchno-tehnicheskoi Informatsii Vsesoyuz. Nauchno-issledovatel'skii Institut Zhivotnovodstva*, 8 Marta U1. No. 3, Moscow, U.S.S.R.

#### PROTEIN:

*Fish Protein Product*, by Horace N. Brocklesby and John R. Patrick, U. S. Patent #2,934,433, printed. U. S. Patent Office, Department of Commerce, Washington 25, D. C.

#### PUERTO RICO:

*Fishing off Puerto Rico*, by Esteban A. Bird, 107 pp., illus., printed. A. S. Barnes and Company, Inc., 11 E. 36th St., New York 16, N. Y., 1960. Describes sport fishing.

#### RADIATION:

"Commercialization Technology and Economics in Radiation Processing," by H. F. Kraybill and D. C. Brunton, article, *Journal of Agricultural and Food Chemistry*, vol. 8, September-October 1960, pp. 349-356, printed. *Journal of Agricultural and Food Chemistry*, American Chemical Society, 1801 K St. NW, Washington 6, D. C.

"Progress and Problems in Radiation Processing of Food," by Walter M. Urbain, article, *Journal of Agricultural and Food Chemistry*, vol. 8, September-October 1960, pp. 340-342, printed. *Journal of Agricultural and Food Chemistry*, American Chemical Society, 1801 K St. NW, Washington 6, D. C.

#### RED TIDE:

*Notes on the Causes of Discolored Water Along the Southwestern Coast of Florida*, by Robert F. Hutton, Contribution No. 45, 2 pp., printed. (Reprinted from *The Quarterly Journal of the Florida Academy of Sciences*, vol. 23, no. 2, 1960, pp. 163-164.) Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

"Physiological and Ecological Studies on Red Tide. 1--On the Vertical Migration of the Plankton Producing Red Tide (1)," by Y. Yoneda and Y. Yoshida, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 7/8, 1957, pp. 405-409, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

#### SALMON:

*About the Biggest Salmon*, by Will Hayes, 31 pp., illus., printed, \$2.50. Melmont Publishers, 310 So. Racine Ave., Chicago 7, Ill., 1961.

*Age of Pink Salmon and the Pattern of Their Fluctuations in Abundance*, by A. P. Vedenskii, OTS 60-21150, 114 pp., illus., processed, \$1.25. (Translated from *Izvestiya Tikhookeanskogo Nauchno-Issledovatel'skogo Instituta Rybnogo Khozyaistva i Okeanografii*, vol. 41, 1954, pp. 111-195.) Office of Tech-

nical Services, U. S. Department of Commerce, Washington 25, D. C., 1960.

*An Approach to Population Dynamics of the Pacific Red Salmon*, by William Francis Thompson, 4 pp., illus., printed. (Reprinted from *Transactions of the American Fisheries Society*, vol. 88, 1959, pp. 206-209.) *Transactions of the American Fisheries Society*, Librarian, Colorado A & M College, Fort Collins, Colo.

"Calculated Minimum Contributions of Washington's Hatchery Releases to the Catch of Salmon on the Pacific Coast and the Costs Assessable to Hatchery Operations," by C. H. Ellis and R. E. Noble, article, *Fisheries Research Papers*, vol. 2, no. 2, 1959, pp. 88-99, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

"The Early Development of the Chum Salmon, *Oncorhynchus keta* (Walbaum)," by Elizabeth Florence Mahon and William S. Hoar, article, *Journal of Morphology*, vol. 98, no. 1, 1956, pp. 1-48, printed. *Journal of Morphology*, Wistar Institute of Anatomy and Biology, 36th St. and Woodland Ave., Philadelphia 4, Pa.

"Effects of Stream Dredging on Young Silver Salmon (*Oncorhynchus kisutch*) and Bottom Fauna," by William H. Rees, article, *Fisheries Research Papers*, vol. 2, no. 2, 1959, pp. 53-65, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

*Experiments on the Hybridization of Pacific Salmon*, by I. S. Pavlov, Translation Series No. 263, 2 pp., processed. (Translated from *Rybnoe Khozyaistvo*, vol. 35, no. 6, 1959, pp. 23-24.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, February 1960.

"Migration and Fishing Mortality Rates of Columbia River Spring Chinook Salmon in 1955," by Henry O. Wendler, article, *Fisheries Research Papers*, vol. 2, no. 2, 1959, pp. 71-81, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

*Optimum Escapement of Red Salmon in the Nushagak Area of Bristol Bay*, by W. F. Royce and O. A. Mathisen, Contribution No. 71, 12 pp., illus., printed and processed. (Reprinted from *Pacific Fisherman*, October 1959.) College of Fisheries, University of Washington, Seattle, Wash.

*Program for Rehabilitation of Pacific Salmon*, 15 pp., processed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash., April 1961. A survey of the problems concerning Washington State's rapidly diminishing salmon stocks. Covers the evolution of Washington salmon, fish and power, loss of natural salmon spawning area, return of salmon to hatchery-stocked streams, ocean contribution of chinook and silvers as shown from tagging and marking programs, need for salmon predation control, and salmon returns to fish farms. Also discusses the program to aid fisheries of the Columbia River and coastal areas--its objectives and the 3 proposed projects in oceanography studies along the coast of Washington to be carried out by the Washington State Department of Fisheries.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Salmon of the Pacific, by Milo Moore, 24 pp., illus., printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash. The object of this report and analysis of Pacific salmon is projected in the interest of conservation of the resource, for fair consideration of historical and common law rights, and for the enlightenment of those associated with international aspects dealing with the harvest and management of related fisheries. According to the author, "In Washington, during the past 3 years drastic action has been taken to restrict both commercial and sport fishing operations in all areas to provide for greater security for salmon stocks, Hatchery production of reared migrant-size salmon has been doubled to strengthen the runs. Two modern salmon hatcheries have been built and two more are in the process of construction to assist in meeting the demands upon these fisheries. A new concept of fish farming has been established. Over 1,600 surface acres of water area have been placed in production in the rearing of migrant salmon. The States of Washington, Oregon, and California, and the United States Government have collectively, through hatchery production and management, made a real contribution towards the strengthening and maintenance of Pacific salmon stocks." This booklet contains a number of statistical tables showing comparative analysis of North Pacific salmon landings, 1955-59.

"The Seasonal Variation of the Good Fishing Area of Salmon and the Movements of Water Masses in the Waters of Western North Pacific. I--Distribution and Movement of Water Masses," by Kasaburo Taguchi, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 9, 1957, pp. 511-514, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"Seasonal Variation of the Good Fishing Area of Salmon and the Movements of Water Masses in the Western North Pacific. II--The Distribution and Migration of Salmon Population in Offshore Waters," by Kasaburo Taguchi, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 9, 1957, pp. 515-521, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

Sockeye and Pink Salmon Production in Relation to Proposed Dams in the Fraser River System, by F. J. Andrew and G. H. Geen, Bulletin XI, 265 pp., illus., printed. International Pacific Salmon Fisheries Commission, P. O. Box 30, New Westminster, B. C., Canada, 1960. Extensive dam construction recently proposed for the Fraser River system would, on the basis of present knowledge, seriously deplete the sockeye and pink salmon populations, according to the authors. This report presents a review of available information concerning methods of passing adult and juvenile salmon over dams, the possible effects of environmental changes on production of sockeye and pink salmon, and methods of artificially propagating these species. Extensive basic and applied research in salmon biology and fish-power problems is now being undertaken but, according to the authors, there is no justification for expecting early solutions to all of the particularly complex Fraser River fish-power problems.

"A Study of Localized Predation on Marked Chinook Salmon Fingerlings Released at McNary Dam," by Richard B. Thompson, article, Fisheries Research Papers, vol. 2, no. 2, 1959, pp. 82-83, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

Summary of Proposed 1961 Puget Sound Commercial Salmon Fishing Regulations, 9 pp., processed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash. This publication outlines the area changes, a reef-net gear change, dates and gear permitted in the various areas, daily fishing hours, special closure dates and areas, fishing weeks, gill-net mesh sizes, emergency closures, and Indian fisheries.

"Survival of Downstream Migrant Salmon Passing Alder Dam in an Open Flume," by Dale E. Schoeneman, article, Fisheries Research Papers, vol. 2, no. 2, 1959, pp. 30-37, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

#### SARDINES:

Study of the Different Methods of Cooking Sardines, by R. Meesemaeker and Y. Schier, 27 pp., processed. Federation des Industries de la Conserve au Maroc, 37, Rue Mareuil, Casablanca, Morocco, October 1957.

#### SCOTLAND:

Scottish Fisheries Bulletin, no. 7, July 1957, 15 pp., illus., printed. Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland. Discusses the problems of fishery conservation; and the Marine Laboratory's research work on the herring fishery, studies on the environment of herring, demersal fishery investigations, studies of fish parasites, tagging experiments, and skin-diving observations.

, no. 8, December 1957, 15 pp., illus., printed. Includes, among others, the following articles: "Herring Trawling--the Swedish Way," by W. Dickson; "A Preliminary Account of the Turbot in Scottish Waters," by B. B. Rae; "Experiments in Herring Rearing," by H. Wood; and "The Norway Lobster or 'Prawn,'" by H. Wood.

, no. 9, June 1958, 20 pp., illus., printed. Includes, among others, the following articles: "Scottish Herring Fishery Forecast for 1958;" "The Decline in the Landings of Catfish from the North Sea," by B. B. Rae; "The Salmon, a One-Sided Story," by D. H. Mills and W. M. Shearer; "Tagging Halibut," by A. D. McIntyre; and "Fluctuations in the North Sea Haddock Stocks," by R. Jones.

, no. 12, December 1959, 22 pp., illus., printed. Includes, among others, the following articles: "A Comparison of Some Methods Used in Lobster and Crab Fishing," by H. J. Thomas; "Herring Spawning in the Firth of Clyde," by A. Saville; "The Effect of Seals on Scottish Salmon and Marine Fisheries," by Bennet B. Rae; and "How Fast do Fish Swim," by J. H. S. Blaxter and W. Dickson.

, no. 13, June 1960, 24 pp., illus., printed. Includes, among others, the following articles: "Results of Scottish Herring Fisheries in 1959 and Prospects for 1960," by B. B. Parrish and I. G. Baxter; "Some Notes about the 'Boxing' Fishery," by John Steele;



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Holding Lobsters," by H. J. Thomas; "Fluctuations in the North Sea Haddock Stocks. III," by R. Jones; and "German Mid-Water Trawling Experiments," by B. B. Parrish.

, no. 14, March 1961, 24 pp., illus., printed. Includes, among others, the following articles: "The Distribution of Haddock in the North Sea," by Rodney Jones; "Some Recent Scottish Haddock Tagging Experiments," by Rodney Jones; "Dogfish," by Bennet B. Rae; "Tunny Fisheries," by Bennet B. Rae; and "The Capture of a Pacific Salmon in Scottish Waters," by W. M. Shearer.

#### SEA LIONS:

Studies on Steller Sea Lion (EUMETOPHIAS JUBATA) in Alaska, by Ole A. Mathisen, 11 pp., illus., printed. (Reprinted from Transactions of the Twenty-Fourth North American Wildlife Conference, March 2-4, 1959, pp. 346-356.) Wildlife Management Institute, Wire Bldg., Washington 5, D. C.

#### SEA TROUT:

Differences in the Estuarine Ecology of Florida Waters and Their Effect on Populations of the Spotted Weakfish, Cynoscion nebulosus (Cuvier and Valenciennes), by Durbin C. Tabb, Contribution 280, 11 pp., illus., printed. (Reprinted from Transactions of the Twenty-Third North American Wildlife Conference, March 3-5, 1958, pp. 392-401.) The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla.

The Spotted Seatrout Fishery of the Indian River Area, Florida, by Durbin C. Tabb, Technical Series No. 33, 16 pp., illus., printed. Director Florida State Board of Conservation, W. V. Knott Bldg., Tallahassee, Fla., October 1960.

#### SEAWEEDS:

"Drying of Seaweeds and Other Plants. II--Through-Circulation Drying of Laminaria longicruris," by J. H. Merritt, article, Journal of the Science of Food and Agriculture, vol. 11, October 1960, pp. 600-603, printed. Journal of the Science of Food and Agriculture, The Society of Chemical Industry, 14 Belgrave Square, London SW1, England.

#### SHRIMP:

On the Grading and Identification of Domestic Commercial Shrimps (Family Penaeidae) with a Tentative World List of Commercial Penaeids, by Bonnie Eldred and Robert F. Hutton, Contribution No. 46, 30 pp., illus., printed. (Reprinted from Quarterly Journal of the Florida Academy of Sciences, vol. 23, no. 2, June 1960, pp. 89-118.) The Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

A Note on the Occurrence of the Shrimp, PENAEUS BRASILIENSIS Latreille, in Biscayne Bay, Florida, by Bonnie Eldred, Contribution No. 47, 2 pp., printed. (Reprinted from The Quarterly Journal of the Florida State Academy of Sciences, vol. 23, no. 2, 1960, pp. 164-165.) Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

Shrimp (Report on Investigation No. 332-40, under Section 332, of the Tariff Act of 1930, Pursuant to

a Resolution of the Committee on Finance of the United States Senate Adopted in August 1960), 175 pp., processed. U. S. Tariff Commission, 8th and E. Sts., NW., Washington 25, D. C. Describes the domestic shrimp fishery and the processing of shrimp in the United States; discusses domestic production, exports, imports, and consumption of raw shrimp and shrimp products; and gives data on prices, cold-storage holdings, and wage rates in the United States. Also provides data on the shrimp fisheries of foreign countries; considers the interests of domestic producers, processors, and consumers of shrimp; and discusses the probable results of the imposition of the import restrictions set forth in the resolution.

#### SMALL BUSINESS MANAGEMENT:

Cash Management in Small Plants, by Theodore E. Boros, Management Aids for Small Manufacturers No. 124, 4 pp., processed. Small Business Administration, Washington 25, D. C., April 1961. This leaflet is designed to inform owner-managers of small plants about the importance of managing their cash. Management of cash is just as important as the management of sales, production, or merchandising. Policing is the first and very important part of cash management. This action protects cash from loss due to thievery or carelessness. It is done by using effective internal control. The second, and an equally important, aspect of cash management is that of maintaining adequate funds to meet the needs of the business. This can be done by using the techniques of cash planning.

Cost Cutting Through Work Measurement, by Elmer V. Grillo, Small Marketers Aids No. 64, April 1961, 4 pp., processed. Small Business Administration, Washington 25, D. C. Businessmen are increasingly concerned over the growing volume of clerical work, and wondering how to handle the problem. Many are finding that if paper work and office costs are to be controlled, there should be some way of determining whether the work is necessary, how long it should take, and how much it should cost. Work measurement can help answer these questions. Three simple techniques can be employed--the use of past records, current time records or logs, and work sampling. This leaflet describes these techniques and how to use them.

Getting the Most from Your Purchasing Dollar, by G. W. Howard Ahl, Management Aids for Small Manufacturers No. 123, 4 pp., processed. Small Business Administration, Washington 25, D. C., March 1961. This pamphlet tells how the small businessman can check his purchasing policies and procedures. It discusses the duties of the purchasing agent and his qualifications. It also suggests ways to improve the detailed aspects of purchasing, such as delivery, small orders, and discounts.

#### SMELT:

The Smelt, OSMERUS MORDAX (Mitchill), by John Van Oosten, Fish Division Pamphlet No. 8, March 1953, 4 pp., processed. Fish Division, Michigan Department of Conservation, Lansing, 13, Mich.

Smelt Recipes, Fish Division Pamphlet No. 3, February 1956, 6 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 26, Mich.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

## SMOKED FISH:

Histological and Histochemical Investigation of Tissues of Smoked Fish, by A.I. Yuditskaya, PST Cat. No. 158, 8 pp., illus., printed, 50 cents. (Translated from Rybnoe Khoziaistvo, vol. 35, no. 2, 1959, pp. 65-69.) The Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

## SOLE:

"The Larval Development of the Sand Sole (*Psetichthys Melanostictus*)," by Cleveland P. Hickman, Jr., article, Fisheries Research Papers, vol. 2, no. 2, 1959, pp. 38-47, printed. Washington State Department of Fisheries, 4015 20th Ave. W., Seattle 99, Wash.

## SQUID:

"Histological and Histochemical Study on Processing the Squid Meat. I--Histological Properties of the Squid Meat," by Takeo Tanaka, article, Bulletin of the Tokai Regional Fisheries Research Laboratory No. 20, May 1958, pp. 88-89, printed. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

## STORAGE LIFE:

"An Accelerated Oxidation Method for the Estimation of the Storage Life of Frozen Seafoods," by Robert E. Palmateer, T. C. Yu, and Russell O. Sinnhuber, article, Food Technology, vol. 14, October 1960, pp. 528-532, printed. Food Technology, The Garrard Press, 510 No. Hickory St., Champaign, Ill.

## SWORDFISH:

"On the Periodical Change of Fishing Conditions and the Body Length of a Whole Year and the Distribution and Migration of Swordfish of the Northwestern Part of the Pacific Ocean," by J. Nakogome, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 5, 1958, pp. 322-325, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

## TARIFFS:

Import Tariff System of Sierra Leone, WTIS Part 2, Operations Report No. 60-65, 2 pp., printed, single copy 10 cents. Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C., November 1960. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

Singapore, WTIS Part 2, Operations Report No. 60-67, 2 pp., printed, 10 cents, December 1960.

Viet-Nam, WTIS Part 2, Operations Report No. 60-69, 2 pp., printed, 10 cents, December 1960.

Sweden, WTIS Part 2, Operations Report No. 60-70, 2 pp., printed, 10 cents, December 1960.

Dominican Republic, WTIS Part 2, Operations Report No. 60-71, 2 pp., printed, 10 cents, December 1960.

Thailand, WTIS Part 2, Operations Report No. 61-1, 2 pp., printed, 10 cents, January 1961.

Taiwan (Formosa), WTIS Part 2, Operations Report No. 61-2, 2 pp., printed, 10 cents, January 1961.

Republic of Korea, WTIS Part 2, Operations Report No. 61-3, 2 pp., printed, 10 cents, January 1961.

## THAILAND:

Basic Data on the Economy of Thailand, WTIS Part 1, Economic Report No. 60-45, 16 pp., illus., printed, single copy 10 cents. Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A survey of the economy of Thailand, including, among others, a short section on fisheries, covering annual landings, the fishing fleet, Government aid to fisheries, and exports of fishery products.

## TIDES:

Tide Tables--West Coast, North and South America (including the Hawaiian Islands), 1962, 224 pp., printed, \$1. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C., 1961. High and low water predictions.

## TOXICITY:

"The Toxicity of Chemicals on Fish. II--The Estimation of the Effectiveness of Insecticides on the Young Carp, *Cyprinus carpio* Linne," article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 10, 1957, pp. 641-644, printed. Japanese Society of Scientific Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"The Toxicity of Synthetic Detergents and Soaps to Fish," by C. Henderson, Q. H. Pickering, and J. M. Cohen, article, Sewage and Industrial Wastes, vol. 31, 1959, pp. 295-306, printed. Federation of Sewage and Industrial Wastes Associations, 4435 Wisconsin Ave. NW., Washington 16, D. C.

## TRADE LIST:

The Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 each.

Canneries and Frozen Foods--Producers and Exporters--Tunisia, 4 pp. (March 1961). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in canned sardines and tuna.

## TROUT:

"Trout and Trout Hatcheries of the Future," by Keen Buss, article, Transactions of the American Fisheries Society, vol. 88, no. 2, 1959, pp. 75-80, printed. Transactions of the American Fisheries Society, Librarian, Colorado A & M College, Fort Collins, Colo.

## TUNA:

Biología Pesquera del Bonito (KATSUWONUS PELAMIS) y la Albacora (THUNNUS ATLANTICUS) en

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Cuba. 1 (Fishery Biology of Skipjack (*Katsuwonus pelamis*) and Atlantic Blackfin (*Thunnus atlanticus*) in Cuba. 1), by Jose A. Suarez Chabro and Pedro Pablo Duarte Bello, Serie de Estudios sobre Trabajos de Investigacion No. 15, 147 pp., illus., printed in Spanish. Instituto Cubano de Investigaciones Tecnologicas, Via Blanca y Carretera Central, Havana, Cuba, February 1961.

"Morphometric Comparison of the Yellowfin Tuna from Six Grounds in the Indian Ocean," by K. Kurogane and Y. Hiyama, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 6/7, 1958, pp. 487-494, printed in Japanese. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"Morphometric Comparison of Yellowfin Tuna of Southwestern Great Sunda Islands and of the Pacific Water," by Saburo Tsuruta, article, *Journal of Shimonoseki College of Fisheries*, vol. 4, no. 3, 1955, pp. 311-319, printed in Japanese with English abstract. Ministry of Agriculture and Forestry, Marine Products Training Center, Shimonoseki, Japan.

"Morphometric Comparison of Yellowfin Tuna Taken from the Equatorial Pacific," by K. Kurogane and Y. Hiyama, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 7/8, 1957, pp. 388-393, printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"La Paradoja del Atun Tropical Espanol" (The Paradox of the Tropical Spanish Tuna), by Mareiro, article, *Industria Conservera*, vol. 27, no. 259, January 1961, pp. 3-4, printed in Spanish. Industria Conservera Calle Marques de Valladares, 41, Vigo, Spain.

"Relation between Seasonal Variation of Swimming Layer of Yellowfin Tuna and Big-Eyed Tuna and Vertical Distribution of Chlorinity," by J. Nakagome, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 9, 1958, pp. 523-524, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"On the School of Yellow-Fin Tuna, *Neothunnus rarus* (K.), Deduced from the Distribution of Catch on Tuna Long Line," by N. Hirayama, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 7/8, 1957, pp. 373-385, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"On the Seasonal Variation of Swimming Layers of Yellowfin Tuna, Big-Eyed Tuna and Black Marlin in the Area of Caroline and Marshall Islands. 1--On the Seasonal Variation of Swimming Layer," by J. Nakagome, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 9, 1958, pp. 518-522, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"Studies on Movements of Albacore Fishing Grounds in the Northwest Pacific Ocean. 1--Adaptability of

Water Temperatures for Albacores in the Winter Season from Observations of Records on Catches and Optimum Water Temperatures by Fishing Boats," by M. Inoue, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 11, 1958, pp. 673-679, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

#### TURTLES:

*Turtle Recipes*, Fish Division Pamphlet No. 4, April 1952, 4 pp., processed. Fish Division, Michigan Department of Conservation, Lansing 13, Mich.

#### UNION OF SOUTH AFRICA:

Department of Nature Conservation, Report No. 16, 1959, 128 pp., illus., printed. Department of Nature Conservation, Provincial Administration of the Cape of Good Hope, Cape Town, Union of South Africa. This report covers the activities of the Department of Nature Conservation for 1959. It includes, among others, a section of the Division of Inland Fisheries which discusses the two Government hatcheries, the stocking of public waters, fertilization of fish ponds, tidal waters of the Cape, experiments in fish production, and angling licenses.

*Sixteenth Annual Report, Fisheries Development Corporation of South Africa Limited* (Covering Period 1st October, 1959 to 30th September, 1960), 16 pp., printed in English and Afrikaans. Fisheries Development Corporation of South Africa Limited, Seafare House, 68 Orange St., Cape Town, Union of South Africa, March 7, 1961. Presents brief reports on the state of the pilchard, maasbanker, mackerel, and spiny or rock lobster fisheries. Also covers activities of the Corporation--investments, loans to fishermen, and a fisheries cooperative; participation of the Union of South Africa in international conferences; and financial situation of the Corporation.

#### VIRGIN ISLANDS:

*Addendum to Sport and Commercial Fisheries Potential of St. John, Virgin Islands*, by C. P. Idyll and John E. Randall, 2 pp., processed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla., 1960.

#### WASTE DISPOSAL:

*Waste Disposal in the Marine Environment: Proceedings of the First International Conference*, edited by E. A. Pearson, 589 pp., illus., printed, \$12.50. Pergamon Press, 122 E. 55th St., New York 22, N. Y., 1961.

#### WESTERN SAMOA:

"SPC Fisheries Investigation in Western Samoa," by H. van Pel, article, *South Pacific Bulletin*, vol. 11, no. 1, January 1961, pp. 20-22, illus., printed. South Pacific Commission, Box 5254, G. P. O., Sydney, Australia. A report on the observations of the South Pacific Commission's fisheries officer made during a recent three weeks visit to Western Samoa. He found that, although fishing is generally a part-time activity rather than the principal means of livelihood, nearly the entire population takes part in some way. Every type of sea creature which can be taken is considered worth eating. Many different types of

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

gear, both primitive and modern, are utilized, and the fishermen are constantly striving to improve their methods of fishing. Sport fishing is practiced in this area. Many inland ponds have been stocked with tilapia, which have thrived and will soon be ready for harvesting.

#### WHALES:

The Scientific Reports of the Whales Research Institute, no. 15, November 1960, 173 pp., illus., printed. The Whales Research Institute, Tokyo, Japan. Includes, among others, the following articles: "Ry-

ukyuan Humpback Whaling in 1960," by M. Nishiwaki; "Relative Growth of the Fin Whale, *Balaenoptera physalus* (Linn)," by S. Ohsumi; and "Immunogenetic and Marking Approaches to Identifying Subpopulations of the North Pacific Whales," by K. Fujino.

#### WHALING:

Australian Catches of Humpback Whales, 1959, by R. G. Chittleborough, Report 29, 48 pp., illus., processed. Commonwealth Scientific and Industrial Research Organization, Marine Biological Laboratory, P. O. Box 21, Cronulla, Australia, 1960.





## MENHADEN

**THE MENHADEN**, in a sense, is the Atlantic counterpart of the Pacific sardine. It, too, is a member of the herring family, and though its population is very much smaller than that of its Pacific coast relative, it is nevertheless a large one. Unlike the Pacific sardine, the menhaden is used almost exclusively in the manufacture of meal and oil; only small quantities are canned.

The menhaden fishery started in New England, eventually spread southward, and is now centered in the Middle Atlantic States, especially in Chesapeake Bay. The annual catch has fluctuated widely, between 150 million pounds in 1895 and 900 million pounds in 1946. In recent years it has averaged near to 600 million pounds. The purse seine is the most important gear used for catching menhaden; pound nets are also used, but are very much less important.

The meal manufactured from menhaden was formerly used only for fertilizer and the oil only for industrial purposes, but research by the U. S. Fish and Wildlife Service resulted in improvement of both products so that they may now be used in animal and poultry feeds. Menhaden roe is saved out and prepared as a frozen, salted, or canned product.

AT LEAST THREE SPECIES OF MENHADEN INHABIT THE ATLANTIC COAST; all are utilized without differentiation by the fishery. They are pelagic, migratory fish which characteristically travel in schools. Their seasonal migrations control the operations of the fishery. In the spring large schools appear in coastal waters and even in the brackish waters of the bays, sounds, and larger rivers, where conditions are favorable for their feeding and growth. The young fish, about an inch long upon their arrival, attain an average size during the first year of 5 to 6 inches and a weight of 1 to 1.5 ounces. During the second year they grow to a length of 8 to 10 inches, weigh approximately 7 ounces, and yield variable quantities of oil, depending on latitude (more oil northward than southward) and on variable oceanographic conditions. They are believed to mature during the third or fourth year. They increase in oil content, therefore in value, with age and size.

The mature fish are captured chiefly in the fall during their southward migrations to unknown ocean spawning grounds, where they remain until the following spring. Their food consists almost wholly of microscopic plants, chiefly diatoms, and small crustaceans, which swarm at the surface of the sea. These the menhaden strains from the water that passes through its sieve-like gill structures.

LITTLE IS KNOWN ABOUT THE BIOLOGY OF THIS FISH. In view of the increased intensity of fishing and expansion of the fishery, more complete information is needed concerning the biology of menhaden, including (1) the routes followed by the three different species and various "races" of menhaden in their annual migrations; (2) the location of the coast spawning and nursery areas; (3) the parasite which is said to cause sterilization of male menhaden; (4) the food of menhaden and its relation to growth, oil content, and availability; (5) the relation of the oceanic climate, and of the fishing intensity to production and survival of the young and to maintenance of an adequate brood stock.



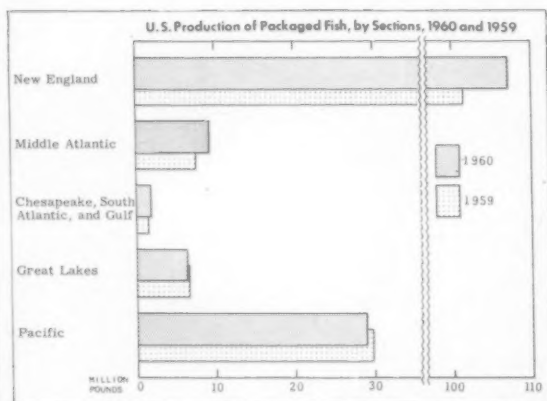




#### U. S. PRODUCTION OF PACKAGED FISH, 1960

C. F. S. No. 2542, Packaged Fish - 1960 (An Annual Summary), shows the United States production of fresh and frozen packaged fish by species, sections, and by methods of preparation, together with comparative data. It also gives data on the production of fish sticks and fish portions, as well as production of consumer packages of certain seafoods for the years 1957-60.

The production of fresh and frozen packaged fish fillets and steaks during 1960 amounted to 152.6 million pounds valued at \$48.3 million to the processors. Compared with 1959, this was an increase of 5.3 million pounds in quantity and \$2.1 million in value. It was estimated that 451 million pounds of round fish were required to produce the 1960 production.



Fillets of Atlantic ocean perch (43.6 million pounds) and haddock (33.3 million pounds) accounted for 50 percent of the total volume and 44 percent of the value of the 1960 production. Fillets of flounders, cod, pollock, and halibut steaks were produced in sizable quantities.

The 1960 production of fish sticks totaled 65.1 million pounds valued at \$28.7 million. Compared with 1959, this was an increase of nearly 5 million pounds but the value was only slightly more than in 1959. The 1960 increase was confined entirely to cooked fish sticks; the production of raw fish sticks was the same as in 1959.

Fish portions production continued to increase in 1960 (48.3 million pounds) valued at \$17.2 million. Compared with 1959 this was an increase of more than 11 million pounds, and 26.5 million pounds above the 1958 production. The 1960 output of both cooked and raw breaded fish portions increased substantially. Raw breaded fish portions production topped 1959 by nearly 9 million pounds; production of cooked fish portions in 1960 was up nearly 3 million pounds from the previous years.

Copies of C. F. S. No. 2542 are available free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

mm

